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A. S. BURLESON,
Postmaster General.

TELEPHONE ENGINEER

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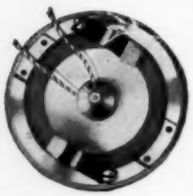

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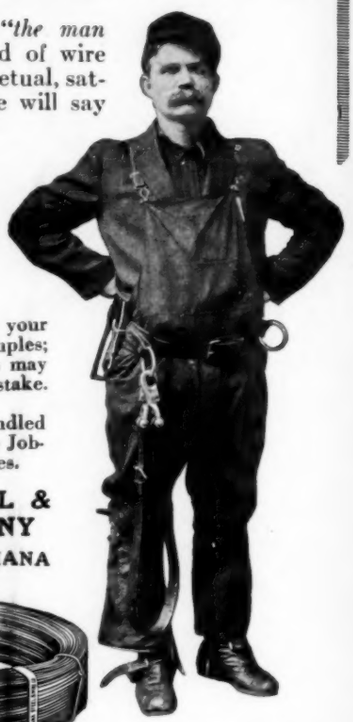

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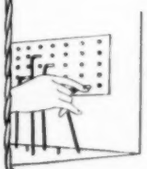

The Electric Cable Co.
10 East 43rd St., New York

F. W. SCHWAMB, Manager

PAUL H. WOODRUFF, Editor
onadnock Building, CHICAGO

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VOL. XX CHICAGO, AUGUST, 1918 NO. 2

The Telephone Industry's Greatest Adventure

IT might have been anticipated that the sudden commandeering of their business property would throw the majority of telephone operating men into a mental panic, with no discredit to them. It is encouraging, therefore, to observe that the representative medium sized operator, or as many of him as we have been able to reach in a short time, is taking the situation philosophically and with a large application of common sense. The telephone man makes a modest official anyway—too modest—and it is difficult for him to vision an organization so large as the United States Government directly interfering with the operation of his five thousand line exchange.

And no doubt he is right. Unquestionably he will continue to manage the property he has managed, and with the same staff to help him in the same way. He can scarcely draw less for his salary than he has been doing; for telephone men are among the poorest paid executives in the world. There are no such high-salaried figureheads in the telephone field as the government lopped off from the railroad system when it assumed control.

Even those pessimists who see nothing but gloom in government operation of all telephones must concede one good result of their ill wind. The rate question, so far as they are concerned, is solved. There will be no more uncertainty as to whether the public will stand for a raise, and no more lost sleep because of discrepancies between revenue and expense.

That the rate situation as an academic problem is settled by government operation does not, however, appear. There is present in the government organization as already announced a complication that bids fair to introduce an entirely new discussion of rate making principles.

Our readers will recall that David J. Lewis, who now takes charge of operation, has long contended that government control would make for a greatly cheapened telephone service. Postmaster General A. S. Burleson himself, the responsible head of all wire lines now, has strongly intimated (TELEPHONE ENGINEER, April, 1918) that rates should be lower. The administration, when it took over the railroad system of the country, did not hesitate, on the other hand, to raise all transportation rates at once, for both freight and passenger traffic. Apparently there is considerable prospect of difference of opinion within the circle of officials representing government operation. This is a war measure, and it is not reasonable to suppose that the administration will entertain any immediate project for reducing rates, even for a popular demonstration of economical and efficient management.

The personnel of the government organization for control of the wires is, of course, of great interest to telephone men. The postmaster general, Albert Sidney Burleson, of Austin, Texas, was educated at Agricultural and Mechanical College of Texas, Baylor University of Waco, and the University of Texas. He was a successful lawyer and a member of congress until his appointment as postmaster general in 1913. David John Lewis was born in Pennsylvania and began coal mining at the age of nine. He learned to read in Sunday school, and studied law while working in the mines. He was elected to the Maryland senate in 1901, and then entered congress. He is a member of the Tariff Board. The other mem-

bers of the committee are John C. Koons, first assistant postmaster general, formerly chief inspector, and William H. Lamar, solicitor of the Post Office Department.

Postmaster Merritt O. Chance of the Washington City post office becomes, under Mr. Burleson's direction, chief of the local telephone system of the capital city. Whether or not this presages a general delegation of telephone authority to all local postmasters has not been stated; but it is logical to suppose it does. How far any postmaster may go, in this case, in his interference with established exchange routine remains to be seen. While postmasters are undoubtedly of as high an order of intelligence and business capacity as their contemporaries in other walks of life, their lack of telephone experience is naturally profound. That is one of the situations which will have to work themselves out.

The age-old objection to government control of public utilities lies in the inherent possibility of political abuse. That this phase of the present situation has occurred to a majority of those directly concerned it would be folly to deny. This line of thought, however, comes under the head of borrowing trouble, and is as sensible as that procedure usually is. There is no political complication now visible on the horizon of either the telephone or the railroad field, and we will assume that there will be none.

A state utility commissioner whose opinion is interesting because of his considerable experience with telephone rates, makes this speculation on future development:

> If the government does as it did with the railroads, guarantee to stockholders the pre-war returns they were getting, it will be confronted at once, when it takes over the lines, with the necessity of spending a large amount of money to take care of demands for extensions. The Bell has been declining—and has been backed up by the capital issues committee at Washington which passes on all stock and bond issues—to make a great many extensions, especially in rural territory, where the demand is now heavy for better service and better lines at a better rental. The government will find it difficult to continue this policy.
>
> The history of the smaller companies is that the inexperienced men who at first take hold make no provision for depreciation. They gaily pay out all surplus in dividends, and these, in the early years, are fat ones. When the system begins to fall down and replacements are necessary, the revenue is entirely insufficient. Dividend paying stops, and as the stockholders are decidedly averse to reaching down into their pockets and putting back any of the dividend money, the company is up against it. The railway commission refuses an increase in rates where it is shown that dividends, covering the entire period, have been excessive. At the present time a number of companies are in this condition, and they are for sale to the bigger companies if the latter will buy. These companies will undoubtedly get higher rates under government control, as the government could not stop to investigate each case and seek to make the stockholders put back any excess dividends and in order to keep them going without a loss to the government would have to make up, in addition to paying dividend returns, higher rate schedules would go into effect. From this viewpoint government ownership would be welcome to a lot of companies.

Upon the condition so logically outlined by the commissioner hangs the possibility, already mentioned, of some little confusion in official circles. The situation demands higher rates. Messrs. Burleson and Lewis, unless direct responsibility modifies their views, will want to experiment with lower rates. Already the Hearst newspapers and their imitators are assuring their readers of "penny telephone" privileges. Only time and experience will answer the interesting question raised by this discrepancy between condition and theory.

The most vitally interesting feature of the act for government control, to the holders of telephone property, is the clause restricting such control to the duration of the present war. The return to private ownership will be infinitely more difficult than the transfer to public control; more difficult in the telephone than in the railroad case. Telephone men, however, are accustomed to difficulties, and are astute enough to prepare for peace in time of war. The proponents of permanent government ownership have had thrust upon them a tremendous strategic advantage; but they cannot hold it without a demonstration of efficiency more extraordinary than we anticipate. It is, of course, wholly possible and reasonable to expect government operation to compare favorably with private operation. But that government operation can excel private operation to any marked degree is not to be expected, because of the exceedingly high level of service reached by the wire companies, large and small.

To summarize the state of mind we would recommend to telephone operators, we expect little change in either operating methods or personnel, a readjustment of revenues that will be permanently beneficial to the industry, and the return of an improved property to its former owners when we win the war.

American girls learning to use tractors in order to increase the country's food supply at the National Service School, Inc., of the Women's Naval Service, Inc.

Manufacture and storage of cedar trees for poles at the yards of E. T. Chapin Company of Spokane, Washington. The decking of the poles in the cedar yards at Bovill, Idaho, is accomplished by locomotive cranes operated by steam power. The eight-inch forty-foot and fifty-foot Bovill poles, as well as the six-inch thirty-foot and thirty-five-foot poles, are handled by the locomotive cranes of tracks of standard gauge before and after their preparation for treatment.

STORIES IN PICTURES OF TLEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Western Pennsylvania Meeting

The Western Pennsylvania Independent Telephone Association at its meeting in Erie, July 26 and 27, adopted resolutions favoring government control of telephone and telegraph systems of the country for the duration of the war.

The resolutions read:

Whereas, The President of the United States has thought it wise to place all telephone, telegraph, radio and cable companies under government control; and,

Whereas, We believe that the best interest of all companies will be conserved, in so far as possible, while under such control; now, therefore,

Be it Resolved, That we, the Western Pennsylvania Independent Telephone Association in convention assembled at Erie, Pennsylvania, on July 27, 1918, do hereby extend to the President and to Postmaster General Burleson our hearty and loyal support in the perfecting of any plans affecting the telephone companies, which shall be to the end that a better or more comprehensive telephone service may be rendered to the government and public in general and thereby hasten the winning of the war.

And be it further Resolved, That in the perfecting of such plans we ask only a fair and impartial consideration of Independent plants and equipment and of the ability of the men now active in the operation and control of the Independent telephone industry in the United States.

And be it further Resolved, That the secretary of the association be instructed to forward a copy of this resolution to the President, Postmaster General Burleson and to our representative in Washington, Mr. MacKinnon.

A committee of five members, composed of E. D. Schade, general manager Johnstown Telephone Company, Johnstown, Pa.; K. B. Schotte, general manager Kittanning Telephone Company, Kittanning, Pa.; W. S. Paca, general manager Petroleum Telephone Company, Oil City, Pa.; John H. Wright, general manager Meadville Telephone Company, Meadville, Pa., and W. H. Wilson, general manager Union Telephone Company of Erie, was appointed with authority to confer with F. B. MacKinnon, vice-president of the United States Independent Telephone Association, on all matters pertaining to government control of telephone properties.

Saturday afternoon the delegates were given a ride on Lake Erie, followed by a fish fry in charge of W. H. ("Pop") Wilson, at which members and their wives were present. About sixty delegates attended the meeting.

Says Public Ignores War Difficulties

Patrons are too prone to measure service by that rendered in normal times, that is, before the United States entered the war, says J. E. Farnsworth, vice president of the Southwestern Telegraph and Telephone Company. It is hard to keep efficient help, even though they have been paid while they are being trained, Mr. Farnsworth declares, and various war activities have made much more work for the telephone operators.

"These conditions have brought about a state of affairs unprecedented in American industry," Mr. Farnsworth says. "Telephone companies were among the first to feel the change because all questions pertaining to the war were promptly discussed over the telephone. The effect was instantaneous and conditions, since the declaration of war, have been changing hourly.

"One of the things that has disturbed the evenness of the service is the change in the use of the telephone which has developed recently and as a direct result of the war. Places where there was little demand for service have suddenly developed tremendous activities. Other districts have, to some extent, fallen off in their demands. War activities are always of an emergency nature. These emergencies create the abnormal demand for telephone service.

"Every special drive with its time limit means abnormal telephone traffic. Liberty loan, Red Cross, Y. M. C. A. campaigns all had their great increase in telephone service. Even a special social event carries with it a peak in telephone traffic. Our plant was built in normal times to care for normal traffic. The forces of war activities have naturally upset our calculations. It is with difficulty that we strive to meet the unexpected.

"Our operating force of some 700 young women must necessarily be worked according to a prearranged plan. Every girl must be told a few days in advance just what hours she is expected to put in at the switchboards.

"We are losing more operators than we did a year ago. This is only a manifestation of that general unrest and anxiety which exists. We are doing everything possible to meet these conditions by making the work of switchboard operating as attractive as we can and by improving the teaching, training and practicing of operators in our operators' training school so that competent operators for commercial service may be more quickly developed.

"With the beginning of the war the importance and necessity of the telephone became greater and the importance attached to it became correspondingly great. More people wanted to talk. Battles were raging, loved ones were offering their lives for the preservation of our country and our liberties. Folks at home wanted to know everything about it. They still want to know. The effect of it all was that the telephones are called on to carry the messages, answer the inquiries, give the news, quickly, to impatient patrons.

"The personal equation is the patron and the operator. If the person calling the number is impatient, sarcastic and surly the immediate effect on the operator is to at once arouse her apprehension if not disgust. She knows that, if the patron were talking face to face with her, the former would hesitate to be rude. The idea is at once suggested that the patron is taking advantage of the operator. The operator is human, the patron is human. Impatience on the part of the patron has just a slight damaging effect on the service. Multiply this impatience by tens of thousands in war time and the telephone service suffers in proportion.

"I can illustrate our condition by asking you if you get as good service at your favorite restaurant. You do not, for the waiters, in many instances, have gone to war.

"One thing the telephone patron forgets is that he is measuring our service by that given at the highest point of efficiency before the war. In those complacent days we were not troubled by many of our girls wanting to change. Our conditions of work were pleasant. We surrounded them with every comfort we could think of or devise, their friends were going their daily ways with only the ordinary cares and annoyances of life, and things were rocking along normally. Our patrons are comparing the service of normal times with the service of the present. If the patron of the telephone will look about him he will find that changed circumstances have affected him personally to a greater degree, perhaps than they have the service of the telephone company."

Government Controls and Operates All Lines

President Wilson Takes Over Telephone and Telegraph Systems July 31 for Duration of War

House Joint Resolution 309 for Government Control of Telephone Companies

THAT the President during the continuance of the present war is authorized and empowered whenever he shall deem it necessary for the national security or defense to supervise or to take possession and assume control of any telegraph, telephone, marine cable, radio system or systems, or any part thereof, and to operate the same in such a manner as may be needful or desirable for the duration of the war, which supervision, possession, control, or operation shall not extend beyond the date of the proclamation by the President of the exchange of ratifications of the treaty of peace: PROVIDED, That just compensation shall be made for such supervision, possession, control, or operation, to be determined by the President and if the amount thereof so determined by the President is unsatisfactory to the person entitled to receive the same, such person shall be paid 75 per cent of the amount so determined by the President and shall be entitled to sue the United States to recover such further sum as, added to such 75 per cent will make up such amount as will be just compensation therefor in the manner provided by section 24, paragraph 20, and section 145 of the Judicial Code.

PROVIDED FURTHER, That nothing in this act shall be construed to amend, repeal, impair, or affect the existing laws or powers of the States in relation to taxation or the lawful police regulations of the several States except wherein such laws, powers, or regulations may affect the transmission of Government communications or the issue of stocks and bonds by such system or systems.

President Wilson's Proclamation

Whereas, It is deemed necessary for the national security and defense to supervise and take possession and assume control of all telegraph and telephone systems and to operate the same in such manner as may be needful or desirable;

Now, therefore, I, Woodrow Wilson, president of the United States, under and by virtue of the powers vested in me by the foregoing resolution and by virtue of all other powers thereto me enabling, do hereby take possession and assume control and supervision of each and every telegraph and telephone system and every part thereof within the jurisdiction of the United States, including all equipment thereof and appurtenances thereto whatsoever and all materials and supplies.

It is hereby directed that the supervision, possession, control and operation of such telegraph and telephone systems hereby by me undertaken shall be exercised by and through the Postmaster-General Albert S. Burleson. Said postmaster-general may perform the duties hereby and hereunder imposed upon him, so long and to such extent and in such manner as he shall determine, through the owners, managers, boards of directors, receivers, officers and employes of said telegraph and telephone systems.

Until and except so far as said postmaster-general shall from time to time by general or special orders otherwise provide, the owners, managers, boards of directors, receivers, officers and employes of the various telegraph and telephone systems shall continue the operation thereof in the usual and ordinary course of the business of said system, in the names of their respective companies, associations, organizations, owners or managers, as the case may be.

Regular dividends hitherto declared and maturing interest upon bonds, debentures and other obligations may be paid in due course, and such regular dividends and interest may continue to be paid until and unless the said postmaster-general shall from time to time, otherwise by general or special orders determine; and, subject to the approval of said postmaster-general, the various telegraph and telephone systems may determine upon and arrange for the renewal and extension of maturing obligations.

Comment by F. B. MacKinnon

Vice-President, United States Independent Telephone Association.

WE DESIRE to call your attention to several important clauses to the resolution as passed by the House and Senate:

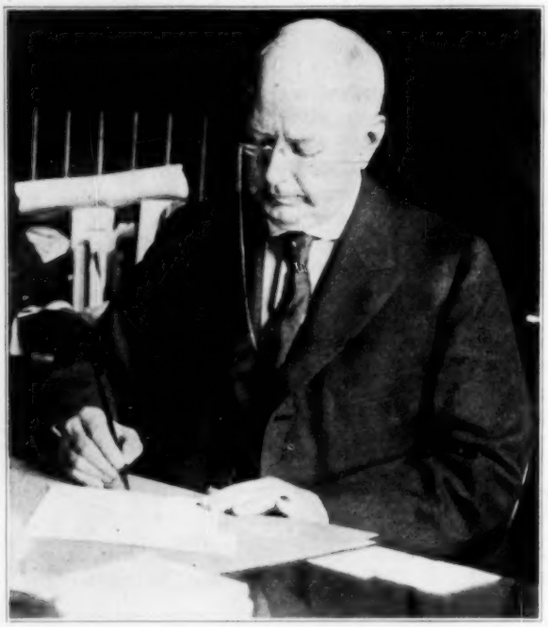
First—The President is empowered to supervise or take control and possession of all the telephone lines or of any part of them that he considers necessary. Anyone familiar with the telephone situation must realize that efficient control over the long distance lines cannot be exercised unless he takes control over some if not a majority of the Independent companies.

Second—The power given the President can only be exercised by him during the continuance of the present war. When peace is declared the properties automatically will be returned to the control of their owners unless by subsequent legislation the control of the government is extended over a longer period.

Third—It is provided that just compensation for the use of the lines and for any damages or expenses due to the supervision and control by the government shall be paid the owners. This compensation will be fixed by authority of the President. If any company disputes the reasonableness of the amount fixed they have the right to accept 75 per cent of the amount and present a claim to the United States courts for the balance they consider due them. This is the procedure followed in con-

nection with the commandeering of ships by the Shipping Board and has worked out satisfactorily for both parties.

Fourth—State control of the telephone companies is not modified except where it will conflict with the sending of government communications and in the matter of the issue of stocks and bonds, the control of which will rest with the federal government during the time



Postmaster General A. S. Burleson, Director General of All Telephones and Telegraphs in the United States.

the government has possession of the properties. This procedure is in line with that adopted in taking over of the railroads.

There has been no indication as yet as to what plan will be followed by the President in exercising the control given him. For this reason we can give you no information as to how competitive situations are to be handled nor as to how rapidly the control will be exercised. Information will be sent you as definite statements are made by the government.

Numerous inquiries have reached me from member companies as to what procedure is to be followed by telephone companies under this order. All that can be said at this time is that all officers and employes of telephone companies are to proceed with the management of the particular part of the business over which they have control the same as if the government was not now supervising and operating the telephone properties.

Such questions as possibly conflict between the new Communications Administration and the Interstate Commerce Commission and State Commission, where these commissions have control over the rates and service of telephone companies, will undoubtedly be given immediate consideration and instructions will be sent to companies. In the meantime, our advice is that all applications before these commissions be proceeded with as before the issuance of the President's proclamation.

As is stated by the Postmaster General, instructions and orders will be issued from time to time as may be necessary. In the meantime, may we not extend to Mr. Burleson the hearty co-operation of all of our companies and employes of those companies in helping him shoulder the great responsibility which has been placed upon him?

* * *

August 1 the First Day

President Wilson's proclamation taking over for the duration of the war operation of telephone and telegraph lines was issued late July 23. It did not include radio systems and ocean cable lines. Government operation and control begins at midnight, July 31.

The president did not exercise the authority given him in the resolution of congress to take over cable and radio systems. No explanation was forthcoming, but it was assumed that control of cables was not taken over because of difficulties presented by contracts cable companies hold with foreign governments. Radio systems already are controlled by the navy department.

Supervision, control and operation of the wire systems is placed under the direction of the postmaster-general.

The president's proclamation provides that the postmaster-general, if he so elects, may administer the lines through the owners' managers, boards of directors or receivers. It provides further that until the postmaster-general directs otherwise the present managements shall continue.

Regular dividends previously declared and interest in maturing obligations shall continue to be paid until the postmaster-general directs otherwise; and subject to his approval the companies may arrange renewal and extension of maturing obligations.

Telegraph and Telephone Service—Bulletin No. 1

July 23, 1918.

POSTMASTER GENERAL BURLESON today issued the following order for the Government control of the telegraph and telephone systems covered by the Proclamation of the President dated July 22, 1918.

JOHN C. KOONS, First Assistant Postmaster General; DAVID J. LEWIS, Commissioner United States Tariff Commission, and WILLIAM H. LAMAR, Solicitor for the Postoffice Department, are hereby appointed a committee for the Governmental management, operation and control of the telegraph and telephone systems covered by the proclamation of the President dated July 22, 1918, of which committee the Postmaster General shall be chairman.

In announcing the appointment of this committee the Postmaster General stated that while the committee would have charge of the Governmental management, operation and control of the telegraph and telephone systems, yet it would be necessary to divide its work to a certain extent, and that Mr. Koons and the Postmaster General would have charge of the administration and organization of the service, Mr. Lewis and the Postmaster General of its operation, and Mr. Lamar and the Postmaster General of the finances.

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

Washington, D. C., July, 27, 1918.

Vice-President F. B. MacKinnon to the Owners and Representatives of Owners of Member Companies:

AUGUST 1, 1918, the physical telephone properties owned by you will definitely pass from your control to that of the United States as represented by the Postmaster General. We are of the opinion that legally the properties passed into the hands of the Federal Government July 23, the date of taking effect of the President's proclamation. But beyond a doubt private control will have ceased and Government control will have begun at midnight July 31.

On August 1, the operating officers, employes and some of the owners of the telephone companies will become Government employes. Other officers will be employes of the corporation owning the properties but not of the Government. Some will be in the dual position of owner or representative of the owner and at the same time an employe of the lessee, the Government.

As the Government organization proceeds the distinction between the corporations and individuals owning the telephone properties and the employes of the Government operating those properties will be more and more evident. The employe will receive his orders and instructions from the Government. The owner will find himself discussing terms of compensation with some of those employes.

By the statute which empowered the President to take possession of the telephone properties the owners of those properties are guaranteed just compensation for the "supervision, possession, control or operation" by the Government. This compensation is to be determined by the President. But the owner can dispute the amount so fixed. As a basis for this contention he must be able to state the value of his physical property and business as of August 1, 1918, the day the Government took possession of it. He will deliver to the Government a going concern with its properties in a certain definite condition, with the good will of the public, with a business earning a certain return, a business built up by constant effort and foresight, and in many competitive situations a business that predominates over its competitor. The Government will take this business in this condition and must return it with compensation for its use and for any injury it may suffer while in Government hands. The property and business must be restored to its owners with the same value as when it passed into Government hands or the Government will have to pay the damages sustained.

Every owner therefore should prepare a definite inventory as of August 1, 1918, setting forth in detail the value of the properties (both physical and intangible values). This inventory should be in such form that it can be submitted to a court should a dispute arise as to just compensation and it proves impossible to reach an agreement on the points of difference. The accounts of many companies will show such an inventory and the entries there can be used in preparing a statement. Those companies that have not set up such accounts should prepare a special statement at once.

By the terms of the President's proclamation owners are permitted to continue to pay dividends and interest until such a time as the Postmaster General shall decide upon a different procedure.

By the terms of the proclamation "subject to the approval of the Postmaster General, the various telegraph and telephone systems may determine upon and arrange for the renewal and extension of maturing obligations."

In the absence of definite instructions as to how to proceed to submit such "renewals of maturing obligations" to the Postmaster General for his approval and the inability of the Postmaster General to pass upon such matters until his organization is perfected, it is our opinion that owners should proceed with the securing of renewals and extensions as heretofore and should notify the Postmaster General promptly of all renewals so arranged that he may have immediate notice of all such transactions for and under way should be proceeded with in our judgment. This is in line with the President's for and under way should be proceeded with in our judgment. This is in line with the President's proclamation which directs that the owners of the companies should continue to operate the properties "in the usual and ordinary course of the business of the systems" until the Postmaster General issues definite instructions.

As to accounting, special steps should be taken to have all records and vouchers so kept as to reflect definitely all transactions and business after August 1st. These will be audited later by the Government accounting officials as required by law.

We urge that especial care be given to provide acceptable service to the public so that no complaint may be registered against any Independent Telephone Company and so that the Government may be assured of our cordial co-operation.

The postmaster-general in his discretion may hereafter relinquish in whole or in part to the owners any telegraph or telephone system over which he has assumed control.

Postmaster-General Burleson, in a statement explaining his plans in operating the wire systems, said there would be no change affecting the press wire service, except to improve it wherever possible.

Mr. Burleson also said that operation and control of farmers' telephone lines would be interfered with only for the purpose of facilitating their connection with longer lines. No general policy, the postmaster-general said, has yet been decided on.

Mr. Burleson's statement accompanying the president's proclamation says:

"Under the president's order, conditions are changed

Letter of F. B. MacKinnon to President Wilson

"The obligation resting upon me to be of every possible assistance to the members of this association, and a desire to be of help to you, are my excuses for presuming to address you at this time.

"In connection with the consideration of the control of the telephone and telegraph systems of the country entrusted to you by the new law, I desire to suggest in behalf of the Independent telephone companies, that as soon as practicable definite announcement be made of the method of control decided upon and the extent of that control—that is, whether all telephone companies are to be supervised or operated by the government, or only a selected few, or none until an emergency shall arise.

"Since the passage of the bill authorizing federal control of the telephone systems, I have received inquiries from different parts of the country that convince me that every man responsible for the operation of a telephone system is in doubt as to his future procedure.

"Of the thousands of Independent telephone companies, there are always some that are engaged in discussing with bankers an adjustment of their finances. All such negotiations are stopped pending definite knowledge of whether under government control, a different procedure will have to be adopted.

"For some time past adjustments have been taking place resulting in the elimination of exchange competition in certain communities where public opinion has demanded such elimination. A number of such situations are in process of being worked out. All such matters are held in abeyance pending your decision as to the form and extent of telephone control.

"The halting of financial and commercial operations cannot but disturb operating conditions, and very soon the telephone service of the country will be affected. Probably you have been informed as to the extent of the Independent industry which operates 15,000 exchanges through 8,000 separate ownerships. Because of the nature and extent of the industry, I feel justified in calling your attention to the conditions I have cited.

"We have a second condition to which has been given much serious consideration by those of us responsible in a general way for the continued efficient operation of the Independent telephone properties. This is the constant depletion of our working forces, both men and women.

"Of necessity the telephone and telegraph companies are the principal sources of supply for men for the Signal Corps. Our problem has been to supply the men needed by the Signal Corps and at the same time maintain sufficient working forces for the operation of the exchanges at home.

"There has been a constant filtering away of our men, due to their enlistment in all branches of the army and navy. Numbers have gone into other industries. It has been our plan to organize our forces into an organization so closely affiliated with the Signal Corps as to form, in effect, a Signal Corps Reserve which will claim for its members all of the employes of the telephone and telegraph companies. This plan has to be delayed until definite announcement is made of the procedure decided upon for supervising the operation of the wire companies, if such supervision is to be.

"In my opinion, the efficiency of our forces and our co-operation with the Signal Corps require an early knowledge of the form and extent of control of the telephone companies, as soon as a decision is reached. My excuse for presuming to offer this opinion is, as I have said, because of a desire to be of service to you as well as to the industry I represent."—July 16, 1918.

President Wilson's Acknowledgment

"Allow me to acknowledge the receipt of your letter of July sixteenth and to say that I appreciate very fully the circumstances to which you call my attention.

"You may rest assured that the action of the government will be taken in a way which will safeguard the interests to which you allude, as far as it is possible for the government to safeguard them. Some time must, of course, elapse before the scope of the government's action is decided, but every endeavor will be made to make that action at every point fair and just."—July 18, 1918.

and greater opportunity is afforded to effect improvements and economies and a larger use by the people of these facilities which have become an imperative need in their every day life.

"Whether advantage can be taken of these opportunities to improve this service to the public remains to be disclosed by experience. Every effort of the department will be directed to the accomplishment of this end.

"It will be the purpose of the Postoffice Department to broaden the use of the service at the least cost to the people, keeping in mind that a high standard of efficiency must be maintained.

"I shall avail myself of an early opportunity to consult with those who have heretofore had the responsibility of directing the affairs of the various wire systems taken over and, I doubt not, will be greatly benefited by suggestions they may be kind enough to offer me.

"The operation or control of what are commonly called farmers' telephone lines will be interfered with only for the purpose of facilitating their connections with the longer lines.

"There will be no change affecting the press wire service, except to improve it, wherever possible.

"Of course, no general policy has been decided upon and will not be until a most careful survey of the whole situation is had and a grasp of conditions as they now exist secured.

"I shall freely avail myself of all advice and suggestions which those in a position to make the same valuable may be good enough to offer me.

"Whenever it is necessary to inaugurate any changes of policy, announcement of such will be made through the postmaster-general."

Consolidations

One of the first actions that is expected is a consolidation of competing lines, especially in the telephone systems. Competing exchanges probably will be connected, so that any subscriber to any system in the country can reach a subscriber on any other system, local or long distance. It will relieve subscribers in cities where two companies operate of the burden of paying both companies for service.

Consolidation of telegraph offices will cut down overhead charges of management, force and rentals, and result in much cheaper operation. These economies will, in part, provide for the 25 per cent increase in wages which telegraph operators expect the postmaster-general to award them.

It is expected that as a part of the postal system, telegrams can be paid for in postage stamps. This will simplify the bookkeeping at the various branch offices. It is possible that ultimately the government may insist that all payment of messages be by stamps.

It is not expected that the present arrangements of charge accounts will be disturbed.

Officials in Charge

Shortly after the president's proclamation, the postmaster-general appointed as a committee to be in charge of the wire lines: John C. Koons, first assistant postmaster-general; David J. Lewis, commissioner United States tariff commission; William M. Lamar, solicitor of the Postoffice Department. The postmaster-general himself will act as chairman of the committee.

Mr. Burleson and Mr. Koons will have charge of the administration and organization; Mr. Lewis and the postmaster of its operation, and Mr. Lamar and the postmaster-general of the finances.

All present employes and managers are continued in their positions until Mr. Burleson and his committee shall have opportunity to reorganize their forces and it is expected even then that there will be few changes.

* * *

It is generally assumed that when Postmaster-General Burleson, with a director of communications acting under him, will organize the wire systems of the country in much the same way that Mr. McAdoo has nationalized the railroad systems, except that he will be answerable to the Postoffice Department. It is understood this arrangement is contemplated because the wire and postal services dovetail easily and duplicate machinery may be avoided if they are placed under one control.

David J. Lewis, former representative from Maryland and now placed in charge of wire operation, a member of the tariff board, was a pioneer advocate of government control of telegraph and telephone lines, and throughout his public career has been an ardent advocate of government control of all communication lines. Though his duties on the tariff board have been heavy, he has been consulted by Mr. Burleson and other officials freely on various phases of government regulation and control of telegraph and telephone lines. It is believed his appointment would be highly acceptable to Postmaster-General Burleson, and his lifelong study of the subject has qualified him as an expert on telegraph and telephone matters.

It is possible that the telegraph and telephone systems might be organized much after the same fashion as the railroads have been, with regional directors, with local directors in cities.

Senator J. H. Lewis of Illinois introduced a bill, July 6, creating a department of transportation and telegraph to manage railroads and telegraph or telephone lines owned, operated, or controlled by the government. The Lewis bill also creates a new cabinet position—Secretary of Transportation and Telegraph, who is to have supervision of rail and water transportation and of telegraphs and telephones.

* * *

Financial Situation

President Wilson's proclamation assuming control of the railroad lines provided the government would pay the lines a fixed rental, based on a three-year average of earnings prior to June 30, 1917. In this manner the government assumes full financial responsibility for the railroads.

The telephone, telegraph and cable lines still are able to finance themselves without particular hardship, and in this respect differ from the position in which the railroads found themselves when relieved by the government. However, their statements have begun to reflect their increased operating costs against their fixed income rates.

Especially is this true of the telephone lines. Net earnings of the American Telephone & Telegraph Company for the calendar year of 1917, although larger than the previous year, show a smaller return on the capital employed. In 1916 the net earnings were $38,013,278, or 9.77 per cent on the $395,635,619 of outstanding capital stock, while in 1917 earnings were $38,471,106, or 9.48 per cent on the $435,658,725 stock then outstanding.

In addition, the company's bonded indebtedness increased from $185,002,100 in 1916 to $190,753,300 in 1917 and at present shows a further increase to $202,900,200.

Any doubts stockholders may have as to the real value of American Telephone and Telegraph, judged either from the point of view of assets or earnings, are apparently not shared by President I. N. Vail.

In a letter regarding the new bonds, Kidder, Peabody & Co., quote President Vail as saying: "The book value of plant assets of this and associated companies, which is far below actual value is $303,500,000 in excess of all liabilities and capital stock outstanding. This means that if the government decides to own the American Telephone & Telegraph Company it should pay well over $150 per share to the stockholders.

"Four and three-fourths per cent on book value of plant will meet all interest and 8 per cent dividends on outstanding capital. Eight per cent is considered a fair return by commissions on control and regulation.

"One hundred and eight dollars has been paid in for every $100 of capital stock."

The Leased Wire Problem

Chicago is seriously concerned as to whether government control of telephone and telegraph systems means interference with private leased wires held by brokers, banks and some of the larger industrial concerns having important branches in other cities.

Both President Wilson and Postmaster-General Burleson have been silent on this point, beyond stating the government's policy on the start will be one of "least possible interference."

Radiating from Chicago to points east, west, north and south is a network of between 150 and 200 privately leased wires. Of this number, seventy or more connect Chicago with New York. These are held largely by brokers. In addition, a number of leased wires are used by a combination of firms and brokers.

Probably the most important are the private wires

held by brokers over which orders to buy and sell securities on the New York Stock Exchange are executed. If these were to be cut off, or the service curtailed, brokers predict transactions on the New York Stock Exchange would develop into a purely local affair, confined to New York city.

If the nation were to lose its central market for securities, and transactions confined to local communities, prices would be adversely affected. Also industrial securities would cease to form attractive collateral for bank loans.

Brokers declare it would be next to impossible to buy and sell securities on the New York Stock Exchange over public wires. The delay in transmission would discourage attempts at active trading. And to curtail the securities market is akin to halting the nation's progress.

Next in importance are the private wire systems of the five large packers, who have direct wire connections with their branch houses and with New York. Without them they would be seriously handicapped in solving their problem of supplying the United States and the allies with meat and meat products.

Fully 85 per cent of the leased wires radiating from Chicago belong to the American Telephone & Telegraph Company. They are known as duplex wires. Telegraph messages can be sent and received on them simultaneously, and at the same time telephone messages can be transmitted over them.

The remaining 15 per cent are wires controlled by the Western Union Telegraph Company.

That Washington has secured full and complete data on the telephone and telegraph systems before deciding to take them under control is known. Several months ago an examiner from the federal trade commission visited Chicago and secured statistics from the local companies for a period of five years. This includes the volume of business handled, the cost of operation, the income and its sources.

Private leased wires are virtually a by-product of the American Telephone & Telegraph Company. They are rented on contracts which renew themselves automatically from month to month, and which may be terminated on thirty days' notice, either by the company or lessee.

Day wires are rented at the rate of $20 per mile per year; night wires at $10 per mile per year. Single wires to New York, therefore, command a rental of $16,000 per year. Duplex wires cost 25 per cent more or $20,000 per year.

Control Forever?

Possession is taken for duration of the war and the act of congress under which the president acts provides that control shall not extend beyond the date of the exchange of ratifications of the general peace treaty at the end of the war, but supporters of government operation see in it the first step in the government's permanent operation of the lines.

Permanent government ownership and operation of telegraph and telephone lines was advocated by Secretary Daniels, and Postmaster-General Burleson said if the systems were as efficiently conducted by the government as the postal service now is they never would go back to private ownership.

American Electrical Goods in Chile

Of all the countries on the west coast of South America, Chile offers the best opportunity for the immedate sale of electrical goods, and the prospects for the future are bright. Germany dominated the market before the war, but acording to a report issued today by the Bureau of Foreign and Domestic Commerce, Department of Commerce, American foods have recently made big gains. German goods had entered the market in the wake of German capital.

Chile is a country where the natural resources and the will of the people make for progressive development along industrial and manufacturing lines, which means a steadily growing demand for power. Special Agent Philip S. Smith, author of the government's report, asserts that this should and will be furnished by harnessing the many waterfalls of the Cordillera of the Andes to electric generators and sending the current to all parts of the central section of the republic.

One of the things that should not be overlooked in contemplating Chile as a future commercial field is the opportunity of uniting a safe investment with a profitable business. If advantage is taken of this situation the relations already existing between the two countries can be strengthened to their mutual profit.

The report analyzes every phase of the electrical-goods business in both Chile and Bolivia and is designed to assist American firms in their efforts to build up and maintain business with the two countries. Under the title "Electrical Goods in Bolivia and Chile," Special Agents Series No. 167, it is sold at the nominal price of 20 cents by the Superintendent of Documents, Washington, D. C., and by all the district and co-operative offices of the Bureau of Foreign and Domestic Commerce.

Washington Company Buys Hotels

Two apartment houses in Washington, D. C., have been purchased by the Chesapeake and Potomac Telephone Company for use as hotels for their employes.

Considering the need for housing and the apparent inability of the employes of the company to find adequate living quarters, the company purchased the Alabama and Monroe apartments for approximately $600,000. The Alabama apartment is at Eleventh and N streets northwest, and the Monroe at Fifteenth and M streets northwest. It is understood that possession will be given the telephone company as soon as release of the present leases of the tenants can be arranged.

An official of the company said the apartments would be used by women employes only. The company is constantly forced to import women from other districts because of their increased business and other causes, and is now forced to find living quarters for them. The company must not only have sufficient room to provide living quarters for its female employes, but must have that room near the offices of the company. The two apartments are expected to be overfilled before the big dormitory the company is constructing on Thirteenth street, between G and H streets, is completed. The company is looking after about 1,800 employes.

Chicago Telephone No. 500,000

A telephone was installed in the State Council of Defense building in Chicago, July 30. Lettered on a silver plate on its base is this:

"The 500,000th telephone in the city of Chicago, installed this day for Samuel Insull, chairman State Council of Defense of Illinois, July 30, 1918."

The Psychology of Telephony

Read Before the National History and Philosophieal Society of Belfast, Ireland

BY JOHN LEE

THE true student is always working at experimental psychology. The working of the human mind is the most entrancing subject, and wherever we are we can watch its operations. The waiter in Mr. Bernard Shaw's early comedy asked us all to watch the working of the barrister's brain. But not only barristers have brains, and the true experimentalist will wish to gather his data from a wider field. He will be interested in the human mind normally, so to speak. He will watch carefully when any factor comes into the normal life which will enable him to study the human mind afresh. Now I am about to claim that the telephone is such a factor. It will be my effort to show that some of the fundamental problems of psychology are capable of fresh consideration by reason of the data which the use of the telephone has placed at our disposal. For the telephone was something more than a new instrument of communication; it was a revolutionary change in our method of communication; the telegraph was less revolutionary. The written message still obtained, not essentially different from the written message which we put carefully in an envelope. It was more brief, more blunt. It eschewed the pretty politenesses of the ready letter writer, the "kind regards," the "Yours faithfully," the "best love to all" and "hope to find you well as it leaves me at present." It went to the point without fuss or flummery. But the telephone wrought a revolution. It brought us back to the courtesies of speech; it threw the cumbrous art of handwriting overboard. It called on us to face each other direct and without intermediary, and so it affected our mental relationship. Deep called directly unto deep. And so it came about that the rector of a distant Yorkshire village, what time he spent his leisure making the telephone into a practicable means of day-by-day communication, really wrought more wisely than he knew. He really set out to put the human mind to a severe test, for the human mind had grown accustomed to the written word as its means of communication, and not readily, as I hope you will see, did it fit itself into the new conditions. Telephony is only at the beginning, we have heard again and again, but I think it is nearer the truth to say that the human mind in its appreciation of the differences which have been wrought by telephony is only at the beginning.

A BAR-RAIL! A TOWEL AN' EVERY-THING!
FREE LUNCH
THAT TOONERVILLE GANG GOT BUSY THE OTHER DAY AND ADDED SOME ARTISTIC TOUCHES TO THE FAKE TELEPHONE BOX IN WHICH THE SKIPPER HAS ALWAYS KEPT A BOTTLE OF LIQUOR.

The secret of the Toonerville Trolley's Way Station Telephone
By Fontaine Fox.

WHY WE SHOUT

To begin with, we have not grasped the central fact that the telephone annihilates distance. Whatever may be our explanation and our theory of the Kantian categories of time and space, the fact remains that the telephone illustrates how deeply the framework of space is upon our minds. It is shown in the first place by the way we bawl into a telephone. That comes from the idea that the person to whom we are speaking is far away. We shout as if we were shouting at them across a valley. The fact is that the people are very near to us. They are so near in fact that in auditory efficiency they are only a few feet. This is proved by the use of the telephone for persons with inefficient hearing, where the telephone actually is only a few feet distance. But our mental frame work is such that we cannot bring oureslves to realize that the telephone has annihilated distance, that it has broken down all walls and barriers, that it has given us a whispering nearness to the person to whom we are speaking. Which of us, using the telephone, realizes for a moment that our lips are to our friend's ear? That puts in a phrase the fact that we have but little conception of what the telephone has done in the annihilation of space.

Now let us examine the content of this conservative psychology. In the first place the phraseology which we use is based on the emphasis of distance. It is as though we thought we are still speaking with two tin cans and a drum of parchment, now shouting at the parchment and now turning our mouths away and shouting through the pure air, "Could you hear *that*, Bill?" The favorite English phrase is "Are you there?" It is an emphasis of distance, a puerile phrase, an indication of vacuity of mind, for indeed we should shudder if the answer "No!" came along. The word "Hello!" which is regarded with disfavor nowadays, took its origin in the convenient shout which made the hills resound. We need other phrases, but much more than that we need the psychological realization that the person

to whom we are speaking is close by. Until we get this psychological realization we shall never use the telephone efficiently. No matter how science may improve it, no matter how clearly and distinctly the newer receiver may give us the distant voice, so long as we have the framework of distance and of wonder as the primary outfit of our minds, just so long shall we shout "Hello!" and "Are you there?" and so long will the telephone continue to be a tin can and a parchment diaphragm.

This conception of distance vanishes from the mind of the expert. I could show you a group of ladies speaking with infinite ease from London to all the great towns of the country. They pass from the Brighton subscriber to the Liverpool subscriber with infinite ease. They speak in a soft, subdued voice, a trained voice, as if they realized the new intimacy. They are not overwhelmed with the wonder of the thing; they are taught to harness the lightning and not to shudder at it. They will say "Liverpool" with a raising inflexion, which means "Please tell me, Liverpool, if you are within earshot"; they will reply "Liverpool" with a falling inflexion which says: "I am in attendance; I am Liverpool and not Newcastle-on-Tyne"; but it does not say or suggest "I am at Liverpool, two hundred miles away." That intimate and trusting use of the telephone needs to be cultivated and then the telephone will be really useful, but it is not done in a generation. The framework of mind to which we have grown accustomed is not readily changed. The psychology of adaption to habit throws its tyranny over us and holds that tyranny fact for many a generation.

THE BURDEN OF DISTANCE

This is why we use stilted speech and why we shrink from intimacy. We speak in the mode of the writer rather than in the natural mode of the speaker. We labor under the burden of distance, which is always present with us, and we speak on the telephone, as Queen Victoria said of Mr. Gladstone, just as if we were addressing a public meeting. The personal nature of a telephone conversation has not yet been grasped. Of this fact we can see various evidences. The telephone is used outrageously in the drama. The speakers bellow through the instrument, and their conversation is a repetition of what the other fellow says: "Mayfair 1861, that you Jimmie? Oh, you are going to catch the 12:30 to Bournemouth, are you? Ah, it will be a very pleasant stay. Yes, I like the Royal Hotel, too." There is a typical stage conversation. It includes what Jimmie said and no more. In fact it is designed to convey what Jimmie said and nothing else. It is the crudest of stage conventions. But it is having one more influence in robbing the telephone of its intimacy. After seeing a telephone-play who would trust the instrument with any secret at all? What may thus be said of the drama can be said with redoubled energy of the kinema. Watch the kinema actress seize the telephone! Watch her as she brings it to her mouth! You can literally see her shouting into it. If ever there is a time when one rejoices at the silence of the kinema it is when the telephone is in evidence. Indeed the telephone and its particular utility in disseminating sound has become the very warp and woof of the kinema drama. And that is not the function of the telephone at all. It is the most secret of all methods of communication. Today between 10 a. m. and 11 a. m. there were some 20,000 conversations in Belfast. They were intimate and secret. The operators do not listen to them; they have something else to do, for the operator's work is so scientifically scheduled that she connects some 240 calls in the hour, and you will at once see that she has little chance of listening, and if she had a chance the one thing she would have no taste for would be to listen. It is safer to speak on the telephone than to speak in a tramcar; it is safer to speak on the telephone than to write. Yet none of us really comprehend the fact.

THE CAUTIOUS LOVEMAKERS

I am assured that love-making on the telephone is only indulged in by rare souls who have learned to trust the instrument. I heard a story some years ago of a man who was known by all the public (including the telephone staff) to be appallingly in love with his wife; it was in the earlier days. An operator found him speaking to his wife; the temptation was too great and she listened, alas! "And besides," he said, "I think I saw a cobweb over the middle of the sideboard. I'd sack her, if I were you." It was unpoetic; it cured the operator of listening. But if you want evidence on this heading come with me to the realm of fiction. English fiction makes a good deal of the love interest. Yet you never can find an instance of a love scene on the telephone. The young people will speak by telephone, but it is a chastened and restrained conversation. I saw a novel last year which handled the situation in this somewhat crude fashion: "Molly!" "Yes, dear." "Did you get my letter?" "Yes, what a lovely letter!" "Which part did you like best?" "Oh, the last paragraph, it was lovely." "I'll write again tonight." "Will you say it all over again?" "Yes, dear." "That will be lovely." Personally, I do not believe that such a conversation ever took place; I doubt if any self-respecting telephone would stand it. But it throws a light on telephone psychology. The writer of that novel was perfectly certain that on the telephone you could only hint at what you intended to say, and that the real declaration of one's inner feelings must be under a sealed cover. I shall come back to this aspect of the question later, but this timidity is all a part of the one fundamental characteristic of our use of the telephone—we have not realized that it annihilates distance—we have not realized its beautiful intimacy. Space is part of the framework of our minds, except when dissolved by the faculty of sight. Some telephone philisophers think that we shall never be rid of the disability until seeing by telephone (so to speak) becomes an accomplished fact; just as we read in that ancient classic, the Book of Job, "I have heard of thee by the hearing of the ear, but now mine eye seeth thee." Something has been done in that direction, but not yet is it part of the interchange of communication, and I am afraid that it is not likely to be. We shall have to modify our telephone psychology without the aid of sight, and it will be a good discipline for us.

ASTONISHING VAGARIES OF TIME.

Much the same might be said as regards time. For some mysterious reason, which I cannot explain, time is always erratic on the telephone. I have had respectable citizens, even ministers of religion, tell me in days gone by that the operator kept them waiting ten minutes. In one case it was a bishop, usually harmless, kindly disposed, and a lover of his kind. He had waited 35 seconds for an answer—too long, we admit, but his conception of the period was amazing. I tried him with my official stop watch, and I asked him

to guess the length of certain periods of time both with the telephone in his hand and without the telephone. His guess was wonderfully accurate without the telephone, but with the telephone invariably he quadrupled the time once it got beyond ten seconds. Other citizens are affected in the other direction. They ask for a number; the operator picks up a plug and taps the jack and finds the number busy. She conveys the information to the caller. Of course she is quick; she is trained to be quick; we know to the decimal of a second how long it takes her to perform the operation. But I am constantly told that she never tries at all, that she just says "number engaged" out of spite or negligence. And this summary reflection on her honor is always based on the presumption that the interval of time is not sufficient. Now it may as well be said that with the telephone in one's hand the estimate of the lapse of small periods of time is invariably aberrant. Why it should be so I do not know, but I have tried my own estimate again and again and I have found it hopelessly wrong. Certainly I am not ready to condemn an operator merely on my own conception of the passage of time; nor am I prepared to pit my conjecture of the passage of time against that of the various appliances given to the operator for making the record, appliances which both indicate the time and check the record. There are circumstances in which three minutes seem to be a desperately short period; I expect the young man and maiden, to whose conversation I have already alluded, would think it had only lasted seconds when, in truth, it ran into tens of minutes. Other types of conversation seem to be prolonged. But the telephone machine is ruthless. Three minutes in its eyes are three single minutes. The operator who asks you to have another call has no interest whatever in cutting you short. She herself has her observers. She is doing her duty under the eyes of strict supervision. She is not knitting, even in days when all the rest of the world is knitting. She is not reading novelettes. She is not talking to her young man, the phantom young man of the subscriber's fancy, for to her the telephone is a professional thing, and even when all the rest of the world does its lovemaking by telephone she will scorn to do so. For to her it is unpoetic, her bread and butter, her craft. To the rest of the world it is an embroidery on life; to her it is life itself. It has modified her conception of space and time in that it has made them real and accurate, the things-in-themselves. The rest of the world are only in process of having its conceptions modified. Psychologically she is in advance of her time.

HOW THE NUMBERS ESCAPE US

There are other characteristics. It is strange how numbers are affected by the telephone. New limitations of memory are revealed. The transposition of digits follows broadly certain well-known laws. A subscriber will look at the directory and pick out a number, say 3547. That is a difficult number to remember in the brief period which elapses from the printed page to the telephone. Why? Because the human mind yearns to give the figures in sequence, and it will give them in sequence unless it is watched. So that 3547 becomes 3457 in, as we may say, the twinkling of an eye. You will all agree that there are certain numbers which will not stick in your memory. There are many instances where subscribers are frequently unable to remember their own numbers. The introduction of the "double" was a help. 3, double 5, 7 is an easy number to remember, for this reason. No doubt some of you have felt aggrieved when we introduced "O" (Oh!) instead of "0" (nought), yet we had reason on our side. It is much easier to articulate "Oh" than "nought"; it is especially to be appreciated in respect of "double oh"; it is a clearer demarcation from 9. A telephone company in the middle west of America once proposed the substitution of "cinq" for "five," in order to avoid the old confusion between "9" and "5." That was an heroic suggestion. We have to get over it by teaching the staff the careful articulation of "five"—rather long—and "nine," crisp and sharp. You will notice, though, it is not so striking in Belfast as elsewhere, because it is nearer the normal in speech, that our operators roll their r's, that they say "sev—en," that they pronounce the consonants clearly; of course they repeate back the figures, as a safeguard, rather differently from the way in which the subscriber has passed them. All this, you say, has nothing to do with psychology; it is a mere matter of articulation.

HEARING AS AN ART

But it has a great deal to do with psychology. Do not forget that the telephone is a metallic instrument. It makes its speech by the vibration of a metallic diaphragm. Compare this to the beautiful flexibility of the human instrument and you will realize that the telephone is at a great disadvantage. Moreover there are some sounds which it is said the telephone does not carry at all, such as sibilants. Now here comes in psychology. The telephone auditor, in listening to the sounds which reach his ear has to build them up into the likeness of speech which reaches his ear direct and without the interposition of a metallic diaphragm. There are therefore two arts involved. There is the art of telephone speech, which has acquired by a process largely subconscious the method of making those sounds which are less efficiently carried by the metallic medium and of slightly emphasizing those sounds which are definitely and clearly carried by the medium. There is also the art of telephone hearing by which one learns to rely on the clearer consonants and to fit in the sounds which come less definitely. So it comes about that the person who hears most efficiently on the telephone is not the person whose hearing is the most acute, but he who has reasonably good hearing and who also has the quasi-musical gift of building sounds into sound-phrases, "out of three sounds he makes," as Browning says, "not a fourth sound but a star." Everyone is not equally successful with telephone speech, but it is true to say that far more persons are successful with telephone speech than with telephone hearing. Having said this by way of fundamental, I have to point out that there are further subtleties. In some extraordinary way not yet explicable there are certain sympathies which we have to take into account. Certain speakers appeal to certain hearers. Certain methods of articulation seem to suit certain psychological tendencies in piecing together the sounds which do come and the sounds which do not come. I have known cases where speakers whom I should expect to be perfectly clear on the telephone do not produce this effect at the distant end. Also I have known cases where men whose hearing is thought to be imperfect have shown astonishing skill in being able to interpret methods of articulation which do not suit the metallic medium of the telephone. The fact is that the telephone does not seem to us to be mechanical. We have forgotten that it can only apply the transmission of

sounds to human use by means of a mechanical medium. There is a great religious leader who is said to be buried with a telephone in his coffin, readily joined up to be used in emergencies. That was a profound compliment to the telephone. For that religious leader always asserted the purely spiritual nature of the resurrection, and in doing so he forgot that by installing a telephone he was insisting upon a mechanical means of transmission.

A REAL NICE GIRL

But something more than the voice is carried. Mechanical though the instrument is yet it does convey a conception of character. There are some, though very few, well-authenticated cases of "falling in love," that emotional crisis of which psychologists have given so many and so varied explanations, over the telephone, without any personal or direct acquaintance. The New York Telephone Company tells its operators that the cultivation of a soft voice is a sure way to matrimony and points boldly to statistics which prove the thesis quite as readily as they prove anything else. But it is not the soft voice which alone, to use a colloqualism, "does the trick." There is some intangible method or inexplicable method of conveying the sense of character by telephone. The subscriber sometimes lays down his telephone, smiles benignly, and says "That is a real nice girl." Of course she is. But why does he say so? He knows nothing of the color of her hair, the poise of her head, the slow graceful carriage of her body, all so dear to the novelist who describes in his own way the motions of love. She has spoken courteously to him—perhaps to the extent of half a dozen words, and at once he makes up his mind that if the worst comes to the worst, he will take her as a daughter-in-law. He sums up her character in a twinkling, without a shadow of doubt, not caring how she behaves to her brother, what her ideals are for the future government of the world, or how she could make a currant cake, in days, that is, when there were currants. I believe that the arrival of our young women as telephonists in France had a marked influence. Crusty generals adopted almost tender addresses; weather-beaten colonels found the telephone suddenly efficient; subalterns developed new chivalrous instincts. They could not help it, for courtesy and determination to help are infectious. Indeed I could go farther. The telephone reveals character in an amazing way. Ordinary interchange of speech often hides our motives. "We say unkind things in a kind way." But the telephone brings out the hidden springs. John Smith, whom you know as a decent citizen, cordial and reasonably kindly, is known to be a brute on the telephone. Not that he changes his spots like the leopard, but that the telephone reveals the spots. There is something to be said, therefore, for the Cupid-blind method of making perfect marriages, not in heaven, but by the telephone. Only those who do it must trust the telephone absolutely and, as I have shown, it is not easy. For the average man or woman amongst us the telephone will be an enemy to love-making. It will reveal that skeleton in the cupboard of our characters which, at any cost, must remain hidden. The telephone is the Mother Hubbard who goes to the cupboard and finds not merely a bone but the complete skeleton.

THE OTHER SENSES

There is room yet for a vast amount of research on this subject. Not indeed that those of us who have spent years of our lives associated with telephone practice have ignored the subject. But for the true investigation the student will need a considerable knowledge of the mechanics of voice production and of the science of acoustics. Even so he will be imperfectly equipped unless he has some acquaintance with the modern developments of psychology. For some of the margin of these studies belongs to psychology. You will readily understand now how strange errors occur in telephone speech. There have been instances where whole phrases have been imagined, to use the popular phrase. It is as if the sub-conscious mind, in building up the material which I have indicated, was sometimes urged forward to operate beyond its proper limits. And other senses come into play. I once knew a telephonist who, whenever she had the task of controlling a certain telephone circuit, always declared that she could smell the chemicals, which were notably allowed to escape in the town at the other end. The remedy was simple. A telephonist who had never been in that town was altogether unaware of the smell. Indeed we have found that the active co-operation of the sub-conscious mind in telephone operating has produced the most curious results. It has not had the check which vision places upon it and in some temperaments has been rather inclined to lead to difficulties. But you must remember that in saying this we are dealing with a twilight realm. The simple fact is that clear enunciation of consonants reduces this twilight realm to very small dimensions. The experienced auditor, using a reasonable care, reduces the possibility of error to almost a negligible degree. In that division of the Head Post Office where telegrams are accepted by telephone—the most severe ordeal to which the telephone is subjected—there is a singularly small proportion of error. Of course we take special pains and it is a subject which is always being studied, but in the main it is true to say that the errors are not more numerous than in the case of telegraphs proper. And it has long been known that even in respect of telegraph symbols, clear and definite though they appear to be, psychological factors have their place in the accuracy of signaling and receiving.

The new science of experimental psychology is making big demands upon us today. Even vast wars are influenced by psychological means: the temperament of nations is regarded as a proper field for the operation of suggestion, and it looks as if the might of arms were within the influence of psychology to some extent which we cannot estimate. From great things we come to small, and I claim that if we are to use the telephone efficiently we cannot despise the close study of these psychological factors. If we kept some sort of open mind on this subject, some sort of tolerant expectation of more light, we should be less prone, at times, to lose our tempers and less prone to blame a body of women who are rendering the public really faithful and zealous service. For the greatest beauty of the telephone lies in the fact that it makes a corporate demand. The best telephone in the world cannot give an efficient service to the man who does not speak clearly to the middle of the diaphragm and does not strive to gather together all the elements of sound which go to make up the speech which is destined for him. The psychology of the telephone is the psychology of mutual dependence. It affects us far more than we suppose. It modifies our speech; it quickens and enlightens our hearing; it sharpens that sub-conscious mind which works ever on our behalf. It shows us that evidence which we take to be certain

is not always positive; it warns thus that sometimes we err in that unconsciously we have made a mental contribution to contributory facts as they seem objectively to be. It is a check against over-confidence, a guidepost against assertiveness, a builder of character in that we learn the lowliness of the human unit and his dependence upon factors the existence of which he has scorned. Thus I claim for telephony a creditable position in the world of psychological practice. Not yet has it come into its own. Only for some 30 years has it affected on any considerable plane our day-by-day lives. But when the day comes, as come it may soon, for the telephone to be extended so as to fulfil more nearly its proper function, we shall realize how great has been its kingdom over the human mind, for in that day the kingdom of the human mind will have its true place among the realms of earth, its true dignity in the league of nations.

Artistic Telephone Users

The telephone and its use is a fruitful source for writers in newspapers and magazines, and the subject has many phases. One phase that seems to be written up right often lately is the inclination of telephone users to draw pictures or figures while talking, says *The Transmitter* of Baltimore.

A group of lawyers and court officials (so the story goes) were asked the other day: "What do you do besides talking when you use the telephone?" At first, several of them stated that they did nothing, but upon second thought pleaded guilty of various artistic endeavors, from elaborate sketches to criss-crosses.

One lawyer said he writes names, sometimes his own, but more frequently the name of some person he knows, who, strange to say, has nothing to do with the conversation.

Another said he frequently embellishes the figures of the number he is calling, while another admitted that he draws indefinite and unfinished pyramids, and should the conversation be prolonged, he shaded these masses.

One stated that he draws constructive squares, joining each other, and also makes lines resembling the floor plan of a house; another favors squares and diamonds, which he proceeds to embellish with circles and angles; while still another recalled that he draws the letter H in block formation, and if the conversation drags, adds the letter O.

If there's pencil and paper handy eight men out of ten—be they lawyers, telephone men or just plain business men—will draw designs of some kind while talking on the telephone, especially if the conversation is prolonged.

It doesn't require any particular talent, as a study of some of the efforts found in telephone booths and on covers of directories will show. It isn't necessary that there be a booth—an ordinary desk set, a stub of a pencil and the back of an envelope will do.

Probably you're among the artistic ones, unless you write with your left hand. Think back to the last time you used the telephone when there was a pencil and a scrap of paper handy. You just naturally picked up the pencil and made the most fearful and wonderful designs on the paper, after which you rolled it up into a little ball and threw it under the desk.

We have several of these artistic telephone users among our own officials. One of the traffic men, for instance, draws nice little sketches of shrubbery and trees and outdoors generally. A commercial official we know prefers Greek temples and still another commercial man confesses to writing numbers and dates. Probably they all do it, in some form, and it would be interesting to take a look through the various waste-baskets some evening for incriminating evidence.

The funny part of it is that the artist doesn't usually realize what he is doing and ten minutes later cannot tell what he drew or whether he drew anything. All the while he is talking he is busy with his pictures, but the making of them does not seem to interfere in the least with the conversation. It has been observed that the more important the conversation, the more complicated and intricate the design.

Of course, one must look to psychology for the answer. That's always a good place to look when you can't find an answer elsewhere. One of the big men in the world of psychology explains it like this:

"I firmly believe that nearly every one who uses a telephone is given to scribbling, writing, drawing or figuring on a bit of paper if it is handy. I always do it myself if a conversation be at all prolonged. It's a curious mental process. Really, it's a dual operation of the mind.

"When a man is waiting, for instance, for a telephone number, his conscious mind is directed attentively to waiting for the answer at the other end. His subconscious mind disengages itself, and if the pad and pencil be there, turns to them. There is no diminution in the intentness of the conscious mind while the hand is busy tracing the figures or what-not upon the paper. It is just that the mind is capable of doing two things at once and gives a demonstration of its ability."

Evidently this subconscious mind is not satisfied with making pictures and scrawls, for it has been observed exercising itself in jabbing holes in book covers with the pen-point, digging into the varnish on the desk, bending clips out of shape and spilling ink. All of which is the probable result of the very American desire to be doing something.

One telephone enthusiast, possessing a doubly-charged subconscious mind, has been accused of using his right hand for gesturing while at the telephone and, on at least one occasion, of setting down the receiver in order that he might do it with both hands. A Frenchman observed once that it must be a source of regret to the American that he has not found some way to utilize his feet while talking over the telephone.

Raises for Chicago Operators

Five thousand switchboard employes of the Chicago Telephone Company have been granted a 10 per cent wage increase.

They were earning from $7 to $15 a week. The notices of the advance were posted in all exchanges.

According to officials, the increase was made possible by cutting off non-essentials such as giving the time of day. This service, it is said, reached an average of 250,000, or one-tenth of all calls. The statement adds:

Increases in cost of operation, due largely to war conditions, have confronted the officials of the company for some time. While endeavoring to keep down the mounting cost the officers have not been unmindful of the increased cost of living which the employes have had to meet.

The task of harmonizing these two situations seemed a hopeless one until the expedient was hit upon of cutting out extra and nonessential service which takes much time of the operators and for which the company receives no compensation. The enormous reduction in free service by refusing after May 1 to give the time of day makes it possible to grant the increase.

Independents Help Signal Corps Recruiting

Report of the Secretary of the Eastern Independent Traffic Association to the National Convention

BY H. E. BRADLEY

UPPERMOST in every man's mind is the question, "Am I doing my part toward winning the war?" or, "What have I done to help win the war?" Every organization in every industry is endeavoring to do its part in the country's service. The Independent telephone companies of the United States are every day engaged in war work while giving the telephone service that is so essential in uniting all parts of the country and in keeping the essential industries in touch with each other and with the government.

These Independent companies, 10,000 in all, are collecting taxes for the government. They are co-operating in promoting the thrift campaigns of the Treasury Department.

But the special work of the telephone companies is in maintaining the man-power of the Signal Corps of the army. This is a natural sequence of the fact that the trained men necessary to the successful operations of the Signal Corps must come from the telephone and telegraph companies.

The services already rendered the country by the Independent telephone companies in connection with the building up of the Signal Corps are so conspicuous and definite that it is very appropriate that at this war convention of the association some time should be given to pointing out the amount and value of that service.

At the time the United States entered into this great war, on April 6, 1917, there was not a single complete field signal battalion connected with our army; in fact, there were only 1,624 officers and men, all told, in the Signal Corps branch of the service. Today there are 3,000 signal officers and 28,000 enlisted men.

How this great expansion was accomplished is a story well worth telling, for while it is a story of the keenness and executive ability of the signal officers of the regular army, its recital also portrays the loyalty and efficient organization of the telephone companies of the country.

Congress in June, 1916, authorized the organization of the Signal Reserve Corps to which qualified men could be appointed officers and in which men experienced in the telephone and telegraph industry could be enlisted. Telegraph and field battalions were to be organized. The distinction between these two battalions was little known among the laymen of the telephone world at that time. But along with many other military terms, they are now everyday expressions to us.

The telegraph battalion, not confined as its name might indicate to telegraph operations, has charge of the semi-permanent telephone and telegraph lines, the pole lines and wires leading from the commercial system to the army headquarters and from the headquarters to the brigade headquarters. From that point clear across No Man's Land the wires and cables and instruments are carried and maintained by the field battalions.

Quick to discern the need of the immediate organization of reserve battalions to take their place in the armies to be recruited in defense of the country, John J. Carty, chief engineer of the Bell system, late in 1916 outlined a plan for the organization among the Bell companies of the country of telegraph battalions.

Officers were commissioned and procedure outlined for the organization and drilling of companies at all of the large operating centers of the Bell companies. Volunteers were asked for. Thousands responded and the organization of the companies was proceeding when war was declared.

Then the need of these new companies and battalions was imperative. It was apparent to the War Department that something must be done and done quickly. The department had neither the time nor equipment for the training of men in the technical requirements of this most important part of our army.

General Squier, chief signal officer of the army, called into conference F. B. MacKinnon, vice-president of the United States Independent Telephone Association, and the representative of the Independent telephone companies on the committee on telephones and telegraphs of the Council of National Defense. To Mr. MacKinnon the needs of the Signal Corps for men and the plans to obtain these men were explained.

General Squier and his staff realized that only from the telephone and telegraph companies could be obtained the technical men absolutely essential to the Signal Corps. Therefore, the telephone companies were asked to supply these men.

The Bell companies were organizing only telegraph battalions. Mr. MacKinnon was asked to secure the co-operation of the Independent companies in the organization, complete with officers and men, of the field battalions. Mr. MacKinnon responded on behalf of the Independent companies that this could and would be done, and with the assistance of the various department signal officers began to set up the special machinery needed to secure the close co-operation of all the Independent companies in every part of the country.

Immediately following the Washington conference, Mr. MacKinnon made a tour of the eastern, central and southern states for the purpose of perfecting organizations to carry on an aggressive campaign among the companies for the recruiting of field signal battalions.

The first meeting was held in Philadelphia, Pa., on April 14, which was attended by over a hundred representatives of telephone companies in Pennsylvania, New Jersey, New York and Maryland.

On April 16, a meeting was held in Indianapolis, Ind., with representatives of companies in Ohio, Indiana, Michigan, Kentucky, Illinois and Missouri.

The meeting in Chicago, on April 17, was for the purpose of conferring with Independent telephone manufacturers' supply men of the Middle West. At this meeting Mr. MacKinnon explained the equipment required by the Signal Corps and the facilities which the companies would be required to furnish the government.

On April 18, a meeting was held in Minneapolis with representatives of the operating companies in Wisconsin, Minnesota, North and South Dakota.

Following this a meeting was held in Omaha, Neb., on April 19, with the Independent men of Ne-

braska and Iowa; on April 20, at Kansas City, Mo., with the representatives of the Missouri and Kansas Independent companies, and on April 23 at Dallas, Texas, with the Independents of Texas, Oklahoma and Arkansas.

All of these meetings were well attended and patriotic resolutions were enthusiastically adopted in which the unqualified support of the Independent companies was pledged our government in the war now being carried on.

As the states covered by the Eastern traffic association (New York, Pennsylvania, New Jersey, Maryland, Delaware and Virginia) were identical with those of the Eastern department, that organization undertook the work of raising three field signal battalions in its territory. A committee known as the Signal Reserve Corps Committee of the Eastern Traffic Association was organized with E. D. Schade, of Johnstown, Pa., as chairman, and H. E. Bradley, Philadelphia, Pa., as secretary. John H. Wright, Jamestown, N. Y., H. A. Oberdorf, Columbia, Pa., and F. W. Twyman, Charlottesville, Va., were the other members of the committee.

Early in May a circular letter was sent to each telephone company in the Eastern department, enclosing a census blank upon which the companies were requested to return a complete list of all men in their employ. The companies responded promptly and from these lists were chosen those available for military service.

A circular was then sent to each man explaining in detail the work of the Signal Corps and the requirements of each grade. Attached to this was an enlistment blank and the response to this appeal was most gratifying.

Four recruiting stations were opened, at Philadelphia, Pa., under the supervision of the secretary, at Harrisburg, Pa., under the supervision of Lieutenant Amthor, who was commissioned at the request of the committee, at Jamestown, N. Y., under the supervision of John H. Wright, and at Rochester, N. Y., under the supervision of Lieutenant Lindsey.

A number of men were commissioned at the recommendation of the committee and the approval of Vice-President MacKinnon, and several of these men, at our request, were ordered into active service and detailed as recruiting officers at the stations named.

Several trips were made throughout the territory for the purpose of examining and swearing in the men who had applied from the rural districts, and more than 200 were obtained.

Although we had only promised to try and raise three battalions in our territory, we had completed that number by the first of September, and as the recruits were still coming in we continued the work and succeeded in completing a fourth battalion by November 1, when our recruiting stations were closed. These battalions were known as the 304th, 305th, 306th and 307th, and were stationed at Camps Meade, Lee, Jackson and Gordon, respectively.

Through our Philadelphia recruiting station we obtained the co-operation of the railroads for the purpose of recruiting telegraph operators for the Signal Corps. A meeting was held in the office of the chief signal officer of the Eastern department in New York City on June 26, which was attended by officials representing the 73 railroads operating in the Eastern department.

At this meeting a plan was worked out whereby each road should furnish its pro-rata share of 800 telegraph operators, based upon the percentage of trackage operated by each in the Eastern department. On this basis 764 operators were to be furnished the Signal Corps from these railroads and over one-third of this number were examined and sworn in through our Philadelphia station. On one occasion we furnished the department with 20 operators on 18 hours' notice.

Our committee is still in service and our later activities have been of an entirely different nature, to which I will refer later.

The Central department was found to be too large to be advantageously handled by one committee. There were also within this department, which consists of 15 states, several separate and distinct telephone organizations. The territory was therefore divided into five groups, each having its own chairman, as follows:

For Ohio, Michigan and West Virginia, Frank L. Beam, of Mt. Vernon, O.; for Indiana, Illinois and Kentucky, Hart F. Farwell, of Terre Haute, Ind.; for Wisconsin, Minnesota, North and South Dakota, George W. Robinson, of Minneapolis, Minn.; for Nebraska and Iowa, Frank H. Woods, of Lincoln, Neb.; and for Missouri, Kansas and Colorado, A. F. Adams, of Kansas City, Mo.

On May 8, 1917, a meeting of the chairmen and committees of the various groups was held in Chicago, and J. C. Kelsey, of Chicago, was selected as department chairman, and W. S. Vivian, of Chicago, as department secretary. A conference was held with the chief signal officer of the Central department and plans outlined for an active recruiting campaign.

The work carried on in this territory was similar to that in the Eastern department. A census of all telephone men was taken and enlistment blanks sent out. The group chairmen were in charge of enlistments in their respective states and through the department chairmen kept in touch with the office of the chief signal officer. Four field battalions were recruited in the Central department, the 308th, 309th, 310th and 311th, and they were stationed at Camps Sherman, Taylor, Custer and Grant, in the order named.

A number of additional recruits were secured in the Central department who were assigned to the 313th and 314th battalions located at Camp Dodge and Camp Funston.

In the Southeastern department the work was in charge of a committee of which J. C. Duncan, of Knoxville, Tenn., was chairman, and Terry W. Allen, of Corinth, Miss., was secretary. In the Southern department, J. B. Earle, of Waco, Texas, chairman, and E. C. Blomeyer, of Waco, Texas, secretary, were in charge of the work.

In these two departments a number of men were recruited who were assigned to battalions located at Camps Gordon and Travis, making a total of 10 complete battalions throughout the entire territory.

Many commissions were granted at the request of the various committees, and while it is impossible to give a complete list the following are perhaps best known in the industry: Majors Gustav Hirsch, Columbus, Ohio; E. O. Baker, Paris, Ill., and Claire J. Shands, St. Louis, Mo. Captains Albert F. Combs, Philadelphia, Pa.; A. B. Sperry, New York City; B. G. Kelly, Philadelphia, Pa.; Donald Robinson, St. Paul,

Minn.; Terry W. Allen, Corinth, Miss., and Geo. W. Dickerson, Galion, Ohio.

In addition to these the War Department has repeatedly asked Mr. MacKinnon to recommend men for special assignments and several have been commissioned and are now in active service. Best known among the latter is Captain W. S. Vivian who is now serving in an important capacity at the American headquarters in France. As an example of ambitious, aggressive, competent officers and men the Independent interests have every reason to be proud of those who have left their service to enter that of the Signal Corps.

Neither should we forget the Independent manufacturer who, while being called upon to put forth extra efforts to supply special equipment for the government, has also given, until it hurts, of his skilled employes.

In many other ways have the Independent companies been called upon to assist by the furnishing of special equipment and service at the various camps, by the giving of free service for the many patriotic organizations and the use of our time and lines in urging subscribers to buy Liberty Bonds and War Savings Stamps.

On every occasion have the Independent companies shown their willingness to co-operate with the government by putting their very best effort into that which they were asked to do.

In the Eastern department, I believe that we have been called upon for a service that no other committee has as yet been asked to undertake—that of recruiting and training telephone operators for foreign service. This was a much more difficult and yet a more interesting task than recruiting the men.

The chief qualifications for admission to a telephone operators' unit is a thorough knowledge of French as well as English, and it may sound strange to you when I say that we were compelled to disqualify several applicants owing to an insufficient knowledge of the latter. This was due to the fact that many of the applicants were foreign-born French who had come to this country since the war began.

The Keystone Telephone Company, of Philadelphia, having offered the use of its school room, we started two classes in local operating work on March 11, with a total of 30 girls. One class was held Monday, Wednesday and Friday evenings and the other Tuesday and Thursday evenings and Saturday afternoons. The first session opened at 7 and was dismissed at 9:30, but at all succeeding sessions most of the girls had assembled by 6 o'clock and we almost had to drive them away from the school.

After two weeks of instruction in this evening school, 11 of these girls passed a rigid examination in local operating with an average of 90 per cent or better, two of them having a rating of 100 per cent and several others coming very close to the mark. These girls were then transferred to the long distance class and others were advanced as soon as they could pass the necessary examination.

After some five weeks of instruction in long distance work they were sworn in on May 9 and are now a part of the Signal Corps. On May 15 they were put into the exchanges of the United Telephone & Telegraph Company to acquire actual experience under all sorts of operating conditions. Some are in the large exchanges while some are on rural lines, and they have been moved about until all are thoroughly familiar with all kinds of equipment. Their training is about finished and they will soon be going over, where Captain Vivian will take them in hand, and as they trained according to the rules published by the United States Independent Telephone Association, we have every reason to believe that he will be proud of them.

Over 200 operators are now in France, and at the present these units are closed, but there is no doubt in my mind that if more are called for the Independents will be asked to furnish their share.

In the beginning I stated that the various committees had failed to make detailed reports of their work to our Washington office. There should be on file, today, in Mr. MacKinnon's office a complete record of every man or woman who has entered any branch of government service from an Independent telephone company. Only by such a record could he intelligently lay before the proper officials a report showing the activities of this organization.

There should also be on file a list of all men of draft age, giving complete information as to their number, classification and qualifications. This is important to the men as well as to the government, for even though a man is in the draft, arrangements can still be made for his going directly to the Signal Corps and credit will be given the company from which he is taken. This means that the Signal Corps gets the kind of men they need and the man is placed to his best advantage in the service.

Summing up, there is no doubt that the Independent telephone companies have been most active in every way during the past year. We have been asked to give, and have given freely, of our time, energy, money and manpower, and the end is not yet. We will be asked to and will make still more sacrifices and be still more active during the coming year. We have every reason to feel that we have done and are doing our duty by our government and humanity in exerting ourselves to the utmost to help win this war.

It has given us our opportunity to show that we were ready, willing and competent to serve when called upon, and official Washington today has a wider knowledge of and a higher regard for the Independent industry, as a whole, than ever before during our entire existence.

Patent Office Wants Men

Will you kindly call attention through your columns to the need for technically trained persons for the examining corps of the Patent Office? Men or women are desired who have a scientific education, particularly in higher mathematics, chemistry, physics, and French or German, and who are not subject to the draft for military service. Engineering or teaching experience in addition to the above is valued. The entrance salary is $1,500.

Examinations for the position of assistant examiner are held frequently by the Civil Service Commission at many points in the United States. One is announced for August 21 and 22, 1918. Details of the examination, places of holding the same, etc., may be had upon application to the Civil Service Commission, Washington, D. C., or to this office.

Should the necessity therefor arise temporary appointments of qualified persons may be made pending their taking the Civil Service examination. Application for such appointment should be made to this office.—J. S. Newton, Commissioner of Patents, Washington, D. C.

How the Signal Corps Organized 100 Girls

Army Telephone Operators in France Speak Both English and French

THE Division on Woman's War Work, Committee on Public Information, issues the following:

Owing to the problems which the use of two languages presented to the American troops in France, and the necessity of accurate intercommunication between the American and the French Armies, the Signal Corps has sent abroad 100 trained women telephone operators, who speak both French and English fluently, to work in military telephone exchanges in bases of supplies and points of embarkation. During 1917, men operators and French women were used for this work. Neither group proved satisfactory.

GEN. PERSHING CABLES REQUEST

Therefore, in the early part of November, a cablegram was sent to the Signal Corps of the United States Army by Gen. Pershing, commander of the American Expeditionary Forces, recommending that, on account of the great difficulty in obtaining properly qualified men, a force of women telephone operators speaking French and English equally well should be organized and sent to France. He required 3 chief operators at $125 a month, 9 supervising operators at $72 a month, 24 long-distance operators at $60 a month, 54 operators at $60 a month, 10 substitute operators at $50 per month, total 100. All should have the allowances of Army nurses and should be uniformed.

Capt. E. J. Wesson, civilian personnel section of the Signal Corps, who is experienced in recruiting emergency groups of trained workers, was given charge of the proposed unit. Capt. W. S. Vivian was made responsible for the housing and general welfare of the operators in France.

SMALL PERCENTAGE QUALIFIED

Thinking that it might be possible to obtain telephone operators with equal command of both languages in parts of the country with large numbers of French inhabitants, an effort was first made to obtain the group from Montreal, Canada, and Louisiana. The announcement was placed in French-Canadian papers, with the result that from 300 to 400 women applied. Out of these only 6 could be considered. The announcement was then made to the press of the country and to telephone companies. A list of 2,400 applications was received, which yielded the names of 2 experienced operators who could speak both languages, and 25 possible eligibles. To this date 7,600 applications have been received. Besides the 100 that have been sent over, 150 fully equipped are now in training schools to meet a possible demand, and a list of 400 as a reserve force is on file.

CLASSIFIED IN GROUPS

The group of 100 is composed for the most part of French girls who have come to America or American girls who have lived in France. The unit was sent in groups of 3 of about 30 each. Groups No. 1 and 2 are made up of experienced telephone operators. Group No. 3 consists of girls who have been given intensive emergency training in telephony. For the most part these girls come from New York State. California and Massachusetts sent the next largest numbers. Seventy-two per cent are Americans; 28 per cent are foreign born—French, Belgian, Canadian, English, Swiss, and Dutch East Indian.

Under existing laws wives of Army officers and enlisted men who are liable for duty abroad are not eligible for membership in this unit. An unauthorized statement, which appeared in many papers, saying that a unit of telephone girls was to be organized, and that many women whose husbands were officers had thus found a way to go abroad, occasioned an enormous number of applications and met with an emphatic denial from the Signal Corps.

RIGID TESTS REQUIRED

Upon filling out the application blanks which asked for facts about age, nationality, knowledge of French and English, previous telephone experience, and health, and which demanded a promise to serve for the duration of the war, the candidate whose answers indicated satisfactory qualifications was given examination by the manager of the local telephone company, who had been authorized by the Signal Corps. A full report on the ability and character of the applicant was submitted to a board of experts in New York. A psychologist gave tests to the prospective operators similar to the methods used by the Army in examining officers. Also, since the work which the unit would perform was of a confidential military nature, and would give the members important knowledge of the movements of troops, their loyalty, and motives for applying for service were thoroughly investigated by Secret Service agents.

BEGAN TRAINING JANUARY 12

On January 12 the first group entered the training schools to be trained in advanced telephony. Practice was then given in the largest private branch exchange in New York, followed by three days' work in cantonment telephone exchanges, to acquire familiarity with military terms. During the period of training military drill was given the women every day. Lectures were delivered to them by officers of the Signal Corps upon the duties of that branch of the Army and its traditions. The importance of the lines of communication in modern warfare was explained, and the various duties of the divisions of the Signal Corps were outlined. Talks upon personal hygiene were given by women surgeons.

On March 2 the first contingent sailed, and later in the month American officers in France were agreeably surprised by hearing over the military telephones operators who used American terms, gave splendid service, and who could translate the message of a French officer to an American officer, or vice versa. A second group sailed on March 16, and a third during the latter part of April. They were stationed in groups of 10 in American bases of supplies and points of embarkation.

The members of the Woman's Telephone Unit were required to pass strict health examinations and were inoculated and vaccinated in the same manner as American soldiers. Out of 60 girls who were inoculated not one fainted. An officer who has seen many soldiers meet the same experience said this was most unusual.

The uniform was designed and prescribed by the

War College. It consisted of a blue coat and skirt made of navy blue serge, strictly tailor made; tailored shirt waist of navy blue palm beach cloth or similar material; and straight-brimmed hat of blue felt, with the official orange and white hat cord of the Signal Corps. The brassard on the left sleeve of the coat is of white whipcord or doeskin, bearing small devices indicating the status of chief operator, supervisor, and operator.

"It would be impossible to brigade an American troop without these girls," Capt. Wesson, who has recruited the unit, states. "They are going to astound the people over there by the efficiency of their work. In Paris it takes from 40 to 60 seconds to complete one telephone call. Our girls are equipped to handle 300 calls an hour. The English Women's Army Auxiliary Corps, the "Waaca," are doing similar work, but they are not equipped with fluent knowledge of French, and the American system of telephony has always been better than the European one.

PERSONNEL OF THE UNIT

The personnel of the Woman's Telephone Unit follows:

Melina J. Adam, Margaret Anderson, Eulalie I. Audet, Grace Banker, Julie Barrere, Emma Marie Brousseau, Almeria Capistran, Bertha A. Carrel, Mrs. Inez Crittenden, Josephine Davis, Cordelia Dupuis, Sara Fecteau, Marie Louise Ford, Anna C. Fox, Esther Fresnel, Marie A. Gagnon, Lydia C. Gelinas, Charlotte Gyss, Darnaby Henton, Matina Heymen, Derise Ingram, Ethel Keyser, Florence F. Keyser, Marie S. La Blanc, Leontine Lamoureux, Nellie Martin, Mrs. Pauline MacDermott, Kathleen Mitchell, Minerva G. Nadeau, Helen A. Naismith, Frances Paine Bigelow, Drucilla Palmer, Lawrence Helene Pechin, Bertha Plamondon, Suzanne Prevot, Minnie R. Richards, Katharine Hay Robinson, Olive M. Shaw, Marion A. Taylor, Evelyn Thomas, Isabelle Villiers, Ethelyn White, Mrs. Clara Whitney, Margaret S. Bleyers, Jeanne Bouchet, Martha L. Carrel, Louise Essirard, Anns LeBorde, Louise Le Breton, Raymond Le Breton, Marie Antonette Neyrat McEntyre, Renne Messelin, Marie Ponsolle, Georgette Schaerr, Albertine Asrents, Edith Dodson, Martha Libert, Estelle L. Caron, Jean Cunningham, Amallem Jackson, Agnes M. Theriault, Winifred Hardy, Elizabeth Hunter, Alice V. Ward, Helen F. Perreton, Dee Van Balkom, Suzanne M. Beraud, Louisette H. Gravard, Margaret Hutchins, Lucille De Jersey, Bertha M. Hunt, Margaret H. Milner, Martha Steinbruner, Marie Floyd, Dorothy L. Sage, Bertha H. Verkler, Lillian V. Verkler, Yvonne M. Gauther, Eugenie Racicot, Maude McLowell, Michele F. Blanc, Marie B. Belanger, Marie L. Bousquet, Suzanne Coheleach, Frances Des Jardins, Blanche Grand Maitre, Adele L. Hoppock, Janet R. Jones, Hopo Kerkin, and Miriam De Jersey.

Michigan Court Limits City's Rights

A city's right to control telephone rates was rigidly limited by the Michigan supreme court in a decision affirming in the Traverse City case that the state railroad commission alone and not the city has the right to fix telephone rates.

In the Traverse City case, the railroad commission, on the application of the Citizens' Telephone Company, raised rates. These rates greatly exceeded the figure named in the original franchise between the city of Traverse City and the telephone company. The city maintained that the commission had no authority to override that agreement. Circuit Judge Wiest decided the commission was right and the supreme court sustains him.

The Citizens' Telephone Company was operating in Traverse City under a franchise which fixed the rates at a very low level. The company applied to the state railroad commission for permission to increase rates, and the city resisted this on the ground that the franchise determined what the rates should be. The Supreme court holds in effect that the authority of the railroad commission, conferred by the legislature supercedes local authority and that the state commission can set aside franchise provisions when public interest of equity requires. The Citizens' company is operating under a franchise in Grand Rapids and the company now has an application before the state commission for permission to increase rates throughout its system, which includes Grand Rapids. The state commission has been withholding action, it is believed, pending the decision of the Supreme court in the Traverse City case.

Arkansas Companies Meet

The Arkansas Telephone Association, composed of about 150 telephone companies operating throughout the state, held a two days' convention at Hot Springs, July 15 and 16. The necessity for a general increase in telephone rates was discussed during the day and it was unanimously agreed that all the companies must have more revenue to offset the increasing prices of materials and labor. W. J. Savage of Fordyce addressed the association on the subject and contended that some of the companies are charging a rate that is too low. Other speakers were E. L. McHaney of Little Rock, W. M. Graham of Clarendon and L. M. Emmerson of England.

The question of government ownership of telephone properties was discussed and a resolution pledging all the telephone properties and all their resources to the government was unanimously adopted. The resolution expressed the association's implicit confidence in the president and his administration.

The next meeting of the association will be held in Little Rock in January. F. B. Sprague of Conway is its president, and A. C. Stuart of Texarkana is the secretary. Other officers are: Charles McKee, first vice president; W. M. Graham, second vice president; Ernest Sowell, assistant secretary.

Dallas Merger Approved

T. W. Gregory, attorney general of the United States, has notified John C. Casler, president of the Dallas Automatic Telephone Company, that the merger of the Southwestern Telegraph and Telephone Company and the Dallas Automatic Telephone Company had been approved, and it is expected that the real work of consolidating the two systems will begin within a few weeks. Legal steps necessary to complete the merging of the two systems are being taken.

A month ago Mayor Lawther, of Dallas, Mr. Casler, Rhodes S. Baker and E. D. Nims went to Washington to urge the merger before the attorney general, pointing out necessity for early approval of the consolidation.

Interference—Its Legal Status

Read Before the University of Missouri Section, American Institute of Electrical Engineers—Concluded from July

BY J. A. WHITLOW

CHAPTER IV.—SUMMARY OF PRINCIPLES.—We may now properly inquire in what direction this study is leading us, and what fundamentals or guiding principles we may deduce from the foregoing discussion of the various phases of conflicts in overhead wires. We must examine the decisions themselves for the underlying ideas consistently applied in the majority of cases.

The wires first upon the highway in pursuance of a right lawfully granted are undoubtedly entitled to undisturbed possession of a reasonable space. Opinion may differ as to what constitutes a reasonable space, but so far as room for personal safety of the line and the public using that line, and for working space, the engineering profession has determined and to a considerable extent agreed as to what constitutes a safe limit for such purposes (55). Anything inferior to such standards would undoubtedly be considered negligence, or not in accordance with good standards. If a franchise holder interfered with a prior franchise, such interference would be classed as "unreasonable" interference, and the owner would either be enjoined or required to bear the expense of removing the interference. Such cases are preventable and all opinions are in accord, even when the railway companies with their superior right upon the highways interfere unnecessarily or in a preventable manner with existing telephone or light companies' wires.

When we arrive at the study of induction cases, however, we enter upon a field that contains many cases of interference that are unpreventable so long as both users occupy the same highway or continue to use equipment of a certain type. With the obligation imposed upon the company desiring entrance into the field already occupied by another utility it would undoubtedly be required to observe a safe distance and to use such facilities as are tried and commercially available for eliminating or avoiding the induction. Failure to do this would undoubtedly be considered negligence or unskilfulness, just as much as failure to erect its poles and wires in a safe manner. Where it can avoid the induction only by building upon the opposite side of the road wherever possible, it undoubtedly would be required to do so. If both sides are occupied by a telephone company, we have seen it permitted to move one and the telephone companies may be required to make joint use of the one side. In general this must be done without expense to the telephone companies, although we have found them required to share the expense, possibly to partly compensate for improvements in the construction occasioned by the move. The telephone companies cannot escape without some inconvenience, however, and finally we arrive at those cases where interference cannot be avoided, without a fundamental change in the telephone system or without one partly abandoning the highway. In the latter case the matter resolves itself into one of relative importance of the franchises, and the right retained by the public.

It must be remembered that a franchise has been variously defined as a grant of certain rights and privileges by the Government to a private party to perform a public duty. Since the grantee is endowed with certain powers belonging entirely to the sovereign power, we cannot divorce the public good from the future relations of the various licensees. For instance we have already come across the following language (see 9):

"A Railway Company across whose track a right-of-way was condemned could not recover for an injury to its franchise as a railroad; and that detention of trains, loss of future business, or additional expenses incident to the future exercise of its corporate powers, could not be taken into the account in estimating consequential damages."

Also referring again to the statement of Deiser " . . . the persons using the streets are not citizens but licensees, and each one holds his rights in subordination to those of the public and other licensees."

The paramount needs of the public must be considered, otherwise it could be deprived of the benefits derived from some later developed gift of nature, or of the benefit of new inventions and discoveries. For instance, we found that granting relief to a telephone company against induction from a railway line threatened the whole future of transportation. The same court referred to a case (56) in which it was even intimated that in that instance the use of pure water for domestic purposes must, from the necessity of the case, give way to the interests of the communities, in order to permit the development of the natural resources of the country and to make possible the prosecution of the lawful business of mining coal. Another instance (57) often cited in this connection sets out the fact that future compensation or a franchise previously granted may be appropriated by the granting of a subsequent franchise for some other public purpose, with new and paramount rights, when required by public exigencies made necessary by increasing wants of society in the development of civilization.

Thompson in his work on Electricity says, in discussing matters of this sort (p. 57):

"In both these cases the one having the prior right must yield his right and submit to damage for the good of his neighbor and of society."

The inference these authorities give us is that in cases where the interference is absolutely unpreventable the interest serving the public in the manner most consistent with the modern developments of civilizations should have a preference.

One thing we may note now is the fact that developments in the science have reached the point where the greater number of interference cases are preventable. This is due to the fact that for telephone work the metallic system has come into general and accepted use. This system permits a transposition of the telephone wires which properly handled, particularly in connection with appropriate transpositions in

[55] See Rules of various National Societies and of the Bureau of Standards.

[56] *Penn Coal Co. vs. Sanderson*, 113 *Pa.* 126.

[57] *Central Bridge Corporation vs. City of Lowell*, 70 *Mass. Rep.* 4, *Gray* 474. 481. (1855).

the parallel electric line, will so nullify the effects of induction as to allow the two interests to occupy the same street, or even the same side of the street at a separation often no greater than is required for a safe clearance. This not only simplifies the matter so far as the metallic lines are concerned but offers a solution of the grounded line difficulty since by making such lines metallic and arranging the proper transpositions, it can be made to operate upon the same highway, but as some expense is attached to these necessary changes, it follows there is controversy as to who shall bear the expense of such changes. The telephone company naturally is willing to remain in undisturbed possession of the street and whatever expense is involved in any change, it naturally feels should be borne by the party desiring space. On the other hand the conflicting interest argues that transpositions are a necessity with any telephone system, irrespective of the presence of another company. It is further argued that the grounded line is obsolete, and not recognized by good modern practice, and adequate service over such lines is an impossibility. Hence rebuilding such lines to make them metallic is creating a value where little or none previously existed, and should not properly be saddled upon another utility. How far are these allegations true, and, if true, to what extent should they be considered?

Instances are not lacking to show that transposing the metallic line is necessary to good service (see *11*) on account of cross-talk induced by induction between the adjacent telephone circuits. When possible to obtain a sufficient clearance at a small cost, such should naturally be acquired. Otherwise is it not consistent with the law in the matter that a new telephone company may require an existing company to make such changes as the present state of the art demands, provided always the new line is itself built in an up-to-date manner? Furthermore, should the grounded line be able to enjoin another telephone line or an electric light line for interference which it could prevent by adopting devices that have been tried and proved effective and are in general good practice? It would seem not. Before the modern system was in general use, the Cumberland Telephone Company (second Nashville case) avoided induction by moving to another street. Yet the court refused it recompense for this expense because, though the injury could thus be avoided in this particular case, it could not always be treated so, and to grant the recovery would be establishing a general rule that would imperil the future of electric transportation.

A rule to be effective should be capable of application both ways. For instance, to secure the best results not only must the telephone lines be transposed but the parallel power wires must also be transposed with due reference to the telephone transpositions. If a telephone company should build upon a street as far as possible from an existing power line, and, although it were particularly modern, it could not operate successfully on account of some needed transpositions in the power wires, could it not compel the power company to transpose its wires without cost? Or could it not require a polyphase or a 3-wire single phase circuit to balance its load so that the unbalanced condition, which is clearly not the best practice, would not unduly interfere? We must reply that it possesses such right and such a condition is likely to prevail as often as the need of transposition on the part of the telephone wires. This is clearly an application of the doctrine, "*sic utero tuo, ut alienum non laedas.*" It is a benefit to the one in whose system the change is made and a duty imposed upon it so that the public interest may be served by the exercise of succeeding franchises. It is clearly behind the times even before the second company arrived and the change was one demanded by good practice and economy irrespective of the presence of another interest. This was well expressed by the Canadian court (see *36*):

"Apart from these legal considerations, we have to remember that the expense complained of has added, and possibly to the full extent of its amount, to the value of plaintiff's property. It was inevitable wholly apart from defendant's presence. Even if hastened the benefit was immediate, and it would be difficult, if not impossible, to settle any portion of the interest on the capital which defendant ought for a time to bear, were its responsibility to that extent concerned."

This increment in value attending the change from the grounded to the metallic line suggests a possibility in profiteering by no means impossible. It is a fact too well known and understood by those familiar with the industry, that rival wire using companies use every endeavor to anticipate each other's needs and be the first to erect poles upon a street in order to enjoy the firm position of the prior occupant. This is often done even if there is little business in sight in that vicinity in the immediate future (Read the Consolidated Electric Case, *17*). If it now becomes incumbent upon the latter telephone or light company to make at its expense all necessary changes in an existing telephone or light system, an opporunity is offered whereby a company can construct its line in a piece-meal or inadequate manner, or install a grounded telephone line which it knows will be inadequate, and which may not even be in keeping with the rest of its system, depending on thus creating for such backward construction, what has been significantly termed a "nuisance value" which must necessarily be improved by a later franchise holder desiring entrance on the highway, to the profit of the prior occupant.

We have seen that the Iowa commission by its rule made the requirement that all the necessary transpositions and the conversion of any grounded lines to metallic must be done at the expense of a later power company. This is an extreme view and does not appear to be in accord with the weight of authority. It is certainly different from the decision already noted of the Vermont commission (*32*) in which the telephone companies, even when in good condition, were required to furnish all necessary material when their wires were moved. It is also opposed to the idea of the Illinois commission which declared grounded lines not standard construction and is opposed to the opinion of the Missouri commission in the Caruthersville case (*51*). While discussing commission opinions we should not overlook the Nebraska Railway Commission's decision recently in granting the application (*58*) of a telephone company to change from a grounded to a metallic system, even though some of the subscribers protested on account of the increased cost. This commission said:

> The first type of telephone that became commercially successful was that commonly referred to as the grounded system . . . . Under favorable conditions, this system affords efficient service at a minimum of investment and operating cost. In

[58] *In re Lincoln T. & T. Co., P. U. R.*, 1915 *D.* 803.

the operation of such plants, however, serious disadvantages developed, the most serious arising from interference with the talking circuit from electrical currents in the earth. It was found that these currents cause cross-talk between the lines, bring noises of various kinds to the talking circuit, and at times make intelligent communication impossible. Cross-talk is also caused by induction between the wires themselves, and if there are a large number of wires on one pole line this trouble is aggravated. The introduction of currents from an electric generating plant into the field of a telephone system invariably creates havoc with the service. . . . the complete metallic circuit overcomes almost entirely the trouble from earth currents, and at the same time, through a transposition of the wires at certain intervals makes possible the prevention of induction from one circuit to another. . . .

The installation of a metallic system, it will be seen from the above, is a logical step in the development of a telephone plant, and may be rendered imperative by changing physical conditions. While grounded plants are still in very general use, they are rapidly being replaced with metallic equipment.

The public is gradually demanding a higher standard of service. . . . . Sooner or later, the patrons of any company will demand metallic service. . . . . The increasing use of electricity for light, heat and power, makes the future of any grounded plant more or less uncertain and precarious.

It is worthy of note that the above argument is presented in the entire absence of any conflicting user.

Deiser in his Law of Conflicting Uses of Electricity, previously referred to, says:

P. 21.

Nor can the holder of another franchise, such as the telephone, hope to recover the cost of remedying defective apparatus, and any telephone apparatus capable of being disturbed to any marked extent by induction must be classed as defective, so long as there exists insulating or isolating devices, such as the complete metallic circuit, or the non-inductive circuit, that would protect the telephone or telegraph lines.

P. 33.

(1) That as to all new telephone or other electric franchises, the use of a metallic circuit to protect the lines from interference by trolley or other high voltages of electricity, is a necessary part of a properly equipped apparatus.

P. 38.

As to injuries inflicted by railway or other electrical company upon another electrical company using a lower voltage by induction, this in normal cases is an injury resulting from the proper exercise of an electrical franchise, and gives rise to no action unless wantonly done or unless done by placing wires in undue proximity to each other. But if the company injured could protect itself by the use of proper modern devices, it has no standing to require its antagonist to bring its own plant up to a higher degree of efficiency than it is willing to provide for itself.

. . . . . .

Telephone and telegraph companies may procure a certain degree of immunity from disturbance through induction by using the McCluer device or the complete metallic circuit. Such a company therefore can obtain no relief from the courts unless it can show that it is maintaining its plant at a state of efficiency consistent with modern development in electrical apparatus. The Canadian cases suggest a test in this connection that seems final. A company not making use of such appliances is certain to be disturbed sooner or later by some electrical franchise, street railway, electric light or electric power. It cannot hope to exclude forever all other franchises from its territory merely because it fears disturbance when it has voluntarily kept its own apparatus at a low state of efficiency.

Finally we may refer to one of the most recent works, "Public Utility Rates." by Parker (1917). On page 144 we find the following:

The Intereference of Public Utilities.—A tendency is seen, in recent court decisions, not to demand an absolute freedom from injury to the plant of one public-utility concern from the operation of another public-utility service, if such freedom from injury would place prohibitive expense or great risk of accident on the concern complained of. Where two different utilities are maintained in given territory, say an electric railway and a water supply, or an electric railway and a gas supply, or an electric railway and a telephone company, a certain minimum burden of damage may be caused by the mere juxtaposition of the two service plants, and this minimum in cases may not be eliminated without such restriction on the operations of one or the other utility as would amount to excessive and prohibitive rates.

. . . . . .

Where no negligence, malice or unskillfulness, on the part of a dependent public utility concern can be shown it would seem that the unavoidable minimum injury is, to use the legal phrase, *damnum absque injuria*—that is "damage without injury" as in the case of an accident for which no one is responsible. Neither utility can put the other out of business; the situation is to be considered from the standpoint of total public benefit, not mere convenience of the earlier concern.

Chicago Earnings Gain Slightly

The Chicago Telephone Company passed the first half of its fiscal year fairly creditably. Despite the fact that operating expenses have been abnormally large, net earnings of the company in the six months ended June 30 were slightly larger than in the same period of last year.

Operating income, however, shows a small decrease over a year ago. This was due to the increase in uncollectable revenues and taxes assignable to operations.

A compilation made from monthly reports reveals that in the first six months of 1918 gross earnings were $11,101,223, compared with $10,774,406 in the same period of last year; operating expenses were $8,254,107, against $7,957,759 in 1917; net earnings were $2,847,123 compared with $2,819,145 a year ago, and operating income was $2,092,438, or only $45,060 less than last year's figures.

On the whole this is a reassuring statement because, as a general rule, public utilities have been showing poor earnings in recent months. Chicago Telephone, however, is running just about even, as revealed by the six months' total.

The three principal items of earnings by months for the first half of the year 1918 follow:

	Oper. rev.	Net rev.	Oper. inc.
January	$ 1,954,371	$ 509,372	$ 374,627
February	1,799,958	439,140	311,432
March	1,828,246	563,245	463,576
April	1,862,245	532,494	402,181
May	1,831,250	414,169	282,557
June	1,825,153	389,703	258,065
Total	$11,101,223	$2,847,123	$2,092,438

As a means of comparison the same figures by months for the first half of 1917 are appended:

	Oper. rev.	Net rev.	Oper. inc.
January	$ 1,842,280	$ 596,480	$ 492,292
February	1,711,238	475,658	361,900
March	1,797,146	482,252	371,339
April	1,808,742	445,336	331,514
May	1,811,961	422,668	305,515
June	1,805,499	396,751	274,938
Total	$10,777,406	$2,819,145	$2,137,498

Oscillation Valve Detectors for Wireless

From the Engineering Supplement of the London Times

BY DR. J. A. FLEMING

ELECTRIC wave wireless telegraphy and telephony involves the use of some form of appliance called a detector, because it detects and renders evident the very feeble alternating currents or electric oscillations set up in the circuits of the receiving apparatus. These oscillations are created by the electric waves coming from the distant transmitter, which fall upon the areal collecting wire attached to the receiver, and create rapid alternating currents in it. Hence this aerial wire is like a hearing trumpet and the detector like the ear; or the aerial may be compared to the lens of a telescope which collects the light and the detector to the eye which is sensitive to the light waves.

COHERERS

In the early days of wireless telegraphy the detector used was the coherer, which, in the form given to it by Marconi, consisted of a glass tube having it in two plugs of silver, nearly touching, and between them a minute quantity of nickel and silver filings. When electric oscillations passed through these loose filings they caused the grains to cohere and so increased the electric conductivity of the mass. This change permitted a current from a local battery to flow through a relay, which in turn operated to close the circuit of a second battery, which actuated the signal-recording instrument. The coherer tube then required a tap to be given to it to restore it to a condition of sensitivity for the next impulse. The connections and adjustments of coherer, tapper, relay, and printer required much skill, and were easily upset. Hence before long this form of coherer was abandoned.

Then followed several forms of coherer detector which did not require tapping, but were self-decohering, such as the rotating steel disk in mercury of Lodge and Muirhead, the mercury carbon coherer of Castelli, and the mercury-tantalum coherer of Walter. These appliances had a limited application, and the next really practical advance was the magnetic detector of Marconi based on the power of electric oscillations to vary the form of the cyclical magnetization curve of hard iron. This instrument was used with a telephone, and being simple, easily adjusted and not readily put out of action, it greatly aided in making radiotelegraphy a practical success.

Increasing telegraphic ranges demanded, however, a more sensitive detector, and an entirely new field of discovery was opened up by the writer's invention in 1904 of the thermionic detector, the first form of which was made known in a British patent application, No. 24850 of November 16, 1904, by J. A. Fleming, and in a paper on "The Conversion of Electric Oscillations into Continuous Currents by Means of a Vacuum Valve," read to the Royal Society of London on February 9, 1905, and published in the *Proceedings* for 1905. This thermionic detector has proved itself to be of enormous utility for detecting electric waves as used in radiotelegraphy or telephony. It depends for its operation on the fact that incandescent bodies in a good vacuum emit electrons, generally negative, though under certain conditions positive ions may also be evolved or produced in the residual gas existing even in a high vacuum.

EDISON'S OBSERVATION

The starting point for the invention was an interesting observation made by Mr. Edison in or before 1884, as follows: If an electric incandescent carbon-filament lamp has a metal plate carried on a wire sealed into the bulb, but not touching the filament, then on rendering the filament incandescent by a direct current it will be found that a galvanometer connected in between the terminal of the metal plate and the positive terminal of the filament will indicate a current; but little or no current will be shown if the galvanometer is connected between the negative terminal of the filament and the metal plate. This fact excited scientific curiosity but no practical application of any kind was made of it by Mr. Edison, nor did he explain it.

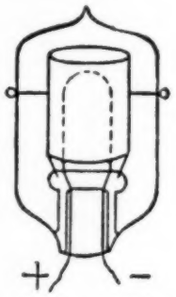


Fig. 1—Fleming oscillating valve.

It was further investigated in 1885 by the late Sir William Preece, who read a paper on it to the Royal Society, and it was examined at still greater length by the present writer in 1889, 1890 and 1896 in papers read to the Royal Society and to the Physical Society. The writer came to the conclusion that the phenomenon was due to the emission of negatively charged atoms or molecules from the filament. In those days the conception of an electron or particle smaller than an atom had not been reached, and it was not until after Sir Joseph Thomson's epoch-making researches that it was recognized that the particles emitted were not atoms of matter but atoms of electricity 2,000 times smaller.

RECTIFICATION OF CURRENT

In spite of all these investigations there was not the smallest suggestion that such a glow lamp with metal plate sealed into the bulb could be used as a detector of electric waves until 1904. At that date the writer was endeavoring to utilize a mirror galvanometer, as used in submarine telegraphy, to detect wireless signals, but this required that the movement of electricity in the galvanometer circuit should be always in the same direction. The electric oscillations set up in the receiving circuit by the radiotelegraphic waves are, however, alternating currents of very high frequency, and with these both the mirror galvanometer and the telephone are inoperative. Hence it appeared necessary to find some means of rectifying the oscillations or suppressing the movements of electricity in one direction, so that to each train of oscillations set up by the spark at the distant transmitter there might correspond in some part of the receiving circuit a simple unilateral flow or gush of electricity.

After careful experiments the writer arrived at the conclusion that this rectification of the electric oscillations could be achieved by inserting in the oscillatory circuit a vacuum valve consisting of an exhausted glass bulb having a carbon filament sealed into it like a lamp, and also a metal plate carried on a third terminal, the filament being made incandescent by an insulated battery and the oscillatory circuit connected to the metal plate and to one terminal of the filament. Experiment showed that this valve rectified the oscillations, permitting only the movements of electricity in one direction to pass through the vacuum between the hot filament and the cold plate—viz., those which required movement of negative electricity from the filament to the plate.

APPLICATION OF VALVE

It then became possible to use an ordinary galvanometer or telephone receiver to detect feeble electric oscillations provided that a vacuum valve as above described were inserted in series with it. In that system of wireless commonly called the spark system the transmitter sends out groups of electric waves tailing away in amplitude at each spark discharge of the condenser. Hence in the receiving circuits there are trains of intermittent oscillations, and when these are rectified by a vacuum valve there are intermittent gushes of electricity flowing in the same direction. In modern spark systems these sparks or trains are produced at the rate of 500 to 1,000 per second. This unidirectional but interrupted current is exactly that for which the telephone is most sensitive, and hence a vacuum valve placed in series with a telephone and attached to the terminals of the condenser in the receiving circuit of a wireless telegraph plant enables us to hear as a shrill musical sound the rapid series of sparks at the transmitter. When this series is cut up by the sending key into long and short groups in accordance with the signals of the Morse code we have the means of transmitting intelligible words.

This valve receiver depends essentially upon the emission from incandescent bodies of electrons or atoms of negative electricity, and therefore the name thermonic

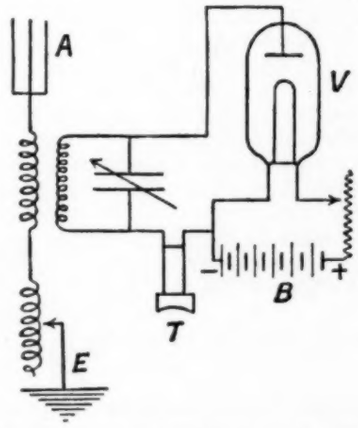


Fig. 2—Oscillating valve as wave detector—A, antenna; B, heating battery; E, earth plate; T, telephone; V, valve.

detector is applied to it and its modifications. It was the first thermionic detector to be employed in wireless telegraphy. One great advantage of it is that it cannot be injured or put out of action by atmospheric electric discharges or by electric waves set up by an adjacent transmitter. The actual valve used in practice is like a small incandescent lamp with carbon or tungsten filament, which is rendered incandescent by a 4 or 6 cell battery of small storage cells. The plate takes the form of a small metal cylinder sealed into the bulb, surrounding but not touching the filament.

THE DE FOREST AUDION

The device was adopted in practical wireless telegraphy early in 1905 by Marconi, to whom it had been shown by the writer, and it was used by him with a telephone for receiving wireless messages. It soon attracted the notice of other radiotelegraphists, among others Dr. Lee de Forest in the United States. De Forest had already been experimenting with a Bunsen burner as a possible oscillation detector, but without much success.

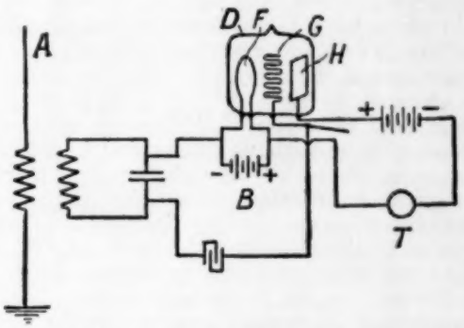


Fig. 3—Double anode thermionic detector—D, exhausted glass bulb; F, carbon or metal filament; G, grid; H, metal plate.

He soon realized the virtues of the Fleming oscillation valve and applied for a number of United States patents for essentially similar receivers. He and others seem to have too hastily assumed that, because Edison had made a scientific experiment with an incandescent electric lamp having a metal plate sealed into the bulb, no invention was required to apply such an appliance as a receiver in wireless telegraphy.

Recent prolonged patent litigation in the United States between the Marconi Wireless Telegraph Company of America and the De Forest Radiotelephone and Telegraph Company has, however, cleared away misconceptions on this point. In the United States District Court of the Southern District of New York Judge Mayer, giving judgment on this matter last September, decided that the Fleming valve patent controlled the manufacture and sale of the de Forest audion, which was an electric glow-lamp thermionic receiver like the writer's oscillation valve, modified by the employment of a metal grid and a plate in place of a single plate. The audion was declared to be an infringement of the principal claims of the Fleming valve patent. The skilful attempt made by the defendants to construe the de Forest Bunsen burner patent as an anticipation of the writer's invention was dismissed by the judge who decided that this burner device had never been commercially used nor made any impression on the art, and that in so far as de Forest had produced any practical detector he had done so in consequence of knowledge gained from the Fleming specifications or scientific publications.

The judgment was not accepted by the defendants as final, and they therefore carried the case to the United States Circuit Court of Appeals by which judgment was given last month. Three judges unanimously affirmed the decree of the lower Court, and stated that the writer's application of an incandescent lamp with metal plate in the bulb as a detector of electric waves did involve invention in a patent sense and was not anticipated by de Forest or anyone else. They also declared that the

Fleming patent was infringed by de Forest's audion or two-anode bulb.

PROPERTIES OF TWO-ANODE VALVE

Attention may, however, be directed to certain peculiar and useful properties of the two-anode valve which renders it capable of magnifying or amplifying electric oscillations. The usual method of working the valve with a single anode or plate is as follows: The electric waves falling on the aerial excite oscillations in it, and these are allowed to create other syntonic oscillations in an inductively coupled circuit comprising an inductance and a capacity. To the terminals of this last condenser is attached a circuit consisting of a telephone in series with an oscillation valve, which rectifies the oscillations as above described (Fig. 2).

In the case of the two-anode valve the filament in the bulb is surrounded by a grid or perforated plate and this again by a solid plate, the filament, grid, and plate being separated by vacuous spaces and all connected to separate terminals sealed through the glass bulb. Then for reception in wireless telegraphy the filament is rendered incandescent by an insulated battery, and one terminal of the filament and one of the grid are connected to the receiving circuit condenser (Fig. 3). A second battery has its negative terminal connected to the filament and its positive terminal to the plate, with insertion of a telephone receiver or other current-detecting instrument. When the filament is incandescent this last battery can send a current of negative electricity across the vacuous space from the filament to the plate inside the bulb in virtue of the thermionic emission from the hot filament. If these electric oscillations are set up in the receiving circuit they are rectified as above described, and the grid acquires a negative potential or charge. This in turn operates to hinder the flow of negative electrons from the filament to the plate, but the peculiarity is that a very small negative current flowing from filament to grid may make a large variation in the negative current flowing from filament to plate.

Furthermore, if the two circuits external to the bulb—viz., the circuit connecting the filament and plate and that connecting the filament and grid—are inductively coupled through an induction coil, there can then be a mutual reaction between the currents in these circuits which sustains and exalts these currents so that an amplifying action results. Again, it is possible to join in series a number of such thermionic detectors so that the plate current of one is employed to create the grid current of the next, and hence to cause a still greater amplification. In this manner the thermionic detector which has been developed out of the single-anode Fleming valve has been proved to be the most sensitive radio-telegraphic detector of electric waves yet invented.

THE VALVE AS A GENERATOR

Finally, the two-anode valve may be used as a generator of continuous electrical oscillations by an action which resembles the experiment called the whistling telephone. If an ordinary Bell receiver is coupled to a carbon transmitter and the diaphragms are held near each other, the receiver emits a shrill sound. This is due to the sympathetic vibrations excited in the transmitter, which again in turn exalt the vibrations of the receiver. So with a two-anode valve, the grid and plate circuits can be coupled so that vibrations excited in one circuit are maintained by the energy drawn from the battery in the plate circuit. In this manner oscillation generators have been made for use in wireless telephony. This thermionic generation of oscillations is doubtless capable of great improvement, and constitutes a valuable addition to our resources in the development of radio-telephony.

The Protection of Democracy

By Theodore N. Vail

Two thousand years ago a new era, a new religion, dawned upon the world.

Whatever of civilization, of freedom or of liberty we have and enjoy comes from the subordination by man of human passion and selfishness because of the teachings, the incarnation or reincarnation of the ideals and principles of that religion.

Peace and good will on earth to men. Peace on earth to men of good will is the basis of liberty of mankind.

Our democracy is based on liberty, the liberty of all to live and enjoy life, the fullest liberty to each individual consistent with the same right to all other individuals. More is impossible.

Under this civilization has come greater peace throughout the world. Wider intercommunication and more neighborly feeling toward our fellow men have been developed.

Man's self-dependence, or independence of others, has passed, but in its place have come greater possibilities of life. Dependence of man upon man implies service of man to man.

To maintain democracy, civilization and service, convention, regulation and law, an organized government is necessary.

The difference between the organization of the government by democracy and that by autocracy is that democracy is government by the will of the governed, and not the government of a few acting by usurped power or that of an insurgent minority.

Government by democracy must be enforced as vigorously, impartially, unflinchingly as that by any other government.

They who differ may express their difference, may do all possible to convert others, so long as it is not done in open defiance or in active rebellion, and so long as their actions are subordinated to the will and authority of the majority.

If and when a majority of all cannot be trusted to express the will of a people, cannot be trusted to act wisely, and all are not willing to abide by it, any government except government by force will fail.

Our democracy is now threatened from without and the democracy of the whole world is at stake.

The protection of our democracy must come from those it protects. Every individual to its protection owes all life, liberty, substance. To the protection of that democracy he must if necessary devote all.

Let us dedicate to our country, in whatever way, whenever and wherever we may be called, our unhesitating, unflinching service, implicit in its obedience and subordination to duty and authority.

Highway Telephones in Oregon

Garage men of Baker, Oregon, are behind a movement to install public telephones along the highways in some sections of the county where ranches are long distances apart, for the benefit of autoists who need assistance or for any other reason. At present on some of the most traveled roads, telephones are so far apart that a motorist in trouble has, in some instances, to walk many miles to send word for help. The garage men will take the matter up with the Commercial club and telephone company, proposing some plan of co-operation whereby the plan may be carried out so that the telephones may be in use this season.

Training of Employment Managers

Six Weeks Courses Under Government Auspices

BY HENRY P. KENDALL*

THE first course of intensive training in employment management under government supervision opened at the University of Rochester on Tuesday, March 26. Twenty prospective employment managers, sent by manufacturers having war contracts, including especially shipbuilding plants and several departments at Washington, began then to take six weeks' intensive training in the practice and theory of employment management. Fifteen Rochester factories provided the laboratory work and assisted the University of Rochester in presenting the theory of personnel management.

The course is given at the express request and under the supervision of the Industrial Service Sections of the several departments at Washington, including the Emergency Fleet Corporation, the Ordnance Department, the Quartermasters' Department, the Department of Labor, and the Navy. The work has the endorsement of the Educational Committee of the General Staff of the War Department and the War Industries Board. The Storage Committee of the latter has undertaken the organization of the work.

The establishment of this course, which will later be repeated in Boston, New York, and elsewhere, gives official recognition to the function of personnel management in factory administration. Hitherto, executive control has been exercised through three main divisions of management:

(1) Finance—usually in charge of the treasurer.

(2) Manufacturing—sometimes in charge of a general manager.

(3) Sales—in charge of a sales manager.

To these general divisions of every industrial enterprise is now added a fourth, i. e. personnel, or, as it is called in these courses, employment or service management. Under the head of employment or service departments are gathered all those activities which have to do with human relations,—legislation, safety, education, recreation, "hiring and firing," discipline, the wage system, pensions, sick benefits, etc. Bringing all these matters together under one head and manning each sub-section with specialists comes as near to scientific industrialism as is possible.

This type of work is new, but it had a very fair start in industry before the war, and in a few plants has had definite development for as long as fifteen years. These pioneer plants are now being studied in order that their experience may be generally applied. Within the last three years manufacturers voluntarily initiated employment departments in so many cases that an association of employment managers sprang up in Boston, Detroit, Philadelphia, Chicago, Cleveland and elsewhere. So far, there is said to be no case on record where a separately functionalized employment and service department once installed has been discarded, and the tendency has been progressively to take out of the hands of superintendents and foremen such authority over personnel management as they have been exercising, and to place it in the hands of a separate department, adding thereto new functions, which formerly there had been no one in the executive staff who had time or training to exercise.

To this new development the war has given a great impetus. France and England very early discovered the importance of giving special study to the psychology and physiology of workers in war plants, and to assignment of specialists to give exclusive attention to the mental and physical needs of workers and assure them just treatment. The British Munitions Ministry, after thorough scientific study, has pointed out to manufacturers the inefficiency of overwork and of inadequate facilities for the workers. The department corresponding to our Ordnance Department in France has instituted intensive training of welfare workers, particularly for plants having many women employes. In this country, industrial service sections were formed in various war conducting departments to assist manufacturers and workers in the solution of the special labor problems rendered acute by the war.

These departments have been hindered in their work by two facts. In this country there were large numbers of workers for whom no one was directly authorized to speak, and many misunderstandings and even strikes have grown out of this fact. On the other hand, whereas the war required the government's guiding manufacturers relative to labor questions along lines often wholly new and required the participation in labor matters by procurement divisions of the government, in more than ninety per cent of the cases there was no executive in our factories assigned to dealing with workers exclusively and able to give effect to the government's labor policies.

A representative of the Industrial Service Section of the Ordnance Department has declared that no labor difficulty has been brought to the attention of that department that could not have been foreseen and avoided if the factory in question had already established a modern employment department. A notable instance came to the attention of the Quartermasters' Department where two mills, side by side, working on the same type of material on government contracts and employing the same type of workers, got totally different results from those workers, because one had a well-conducted employment and service department and the other had not. The former even paid a slightly lower wage, but the one which had no employment department had repeated difficulties, leading to a total shut down from a strike and even though it yielded every demand made by the strikers, including a 15 per cent increase in wages, a shorter work day, the abolition of bonus, and the recognition of a shop committee, it could not fully allay difficulties. Meanwhile, the mill next door kept peacefully on, producing goods every day. This was due to the fact that justifiable complaints of workers were discovered and attended to, as they arose, by the employment department.

The Industrial Service Sections of government agencies are anxious to reduce discord which injures production of war materials, and desirous of having some one in every factory with whom they may deal on labor questions. They have, accordingly, begun to stimulate the establishment of employment departments in various ways. The supply of men competent to administer such work is woefully inadequate, and the movement to establish courses of intensive training in various American universities in conjunction with employment departments of well conducted plants, has grown up as a direct result.

The government has already seen the benefit which may come from short-time, intensive training. Not alone have factory employes rapidly gained proficiency in many tasks when given special instruction, as, for instance, women workers on lathe and other skilled operations, but various types of special training in army work have also been imparted in an astonishingly short time. Officers for the Army have been trained in three months, with fair results. The Ordnance Department has established six-weeks' courses in stores-keeping, and these training schools in warehousing now dot the country at the various universities. The Red Cross conducts intensive courses for its

various types of work. In France the government has successfully conducted courses for employment supervision. Liberal hopes are, therefore, entertained for the first course for employment managers at Rochester and for the further development of the movement at other universities. Specialists in employment work, in the employ of the government, have devised the courses, and besides the laboratory work in factories,—taking fifty per cent of the time,—these will include theoretical instruction in employment department practice, labor economics, industrial organization and management, and the theory of statistics.

The government has no illusion as to what six weeks of training will do for wholly undeveloped material. No one will be admitted to the course who may have just completed his college course and who has a meagre industrial experience. The aim is to have manufacturers of war-contract plants select men who might succeed as employment managers even without training and send them to the courses on their own responsibility. Men of enthusiasm, varied industrial experience, good education, liberal point of view, and the reserve and balance which must accompany the power to command men, should be chosen for this work, and they should be given good salaries and ample authority when they have been properly settled in their work.

So interested are the departments of the government in this work that the Department of Labor sent to the first course two of its field agents in the Federal Employment Service and the Navy contemplates sending assistant superintendents from the Navy Yards, who may later be assigned to employment work there. The industrial service sections of other government departments hope to create an adequate reserve of employment managers for their plants. The Emergency Fleet Corporation offered to pay six dollars a day for sustenance to any students sent by a shipyard.

It is desired, moreover, that the manufacturers themselves take a hand in the development of this movement and send students on their own initiative. Any member of the National Chamber of Commerce that wishes to apply to send a student to one of these courses should write to Employment Managers' Division, 5207 New Interior Building, Washington, D. C., which is handling the detailed work for the various departments co-operating. The next course is at Boston with Harvard University, the Massachusetts Institute of Technology and the Boston University co-operating in the instruction and the Boston Employment Managers' Association directing the laboratory work.

C. & P. Co. Abandons Automatic Idea

Flatly abandoning its determination, expressed in a letter to the public utilities commission March 15 last, to install an automatic telephone system in the District of Columbia, the Chesapeake and Potomac Telephone Company has formally notified the commission that it "does not propose to install automatic or semi-automatic equipment in Washington."

This announcement was contained in answers to sixteen questions asked the company by the commission in a letter dated May 1. It cleared up the question of the company's attitude on the eve of the hearing conducted by the commission, as to the practicability of installing automatics in the capital. At this hearing experts of the United States bureau of standards presented data growing out of an exhaustive investigation they made of the operation of automatics in other cities. (TELEPHONE ENGINEER, May, 1918, page 215.)

The company's letter of March 15, signed by T. P. Sylvan, assistant to the president, and the communication, announcing the change in policy, indicate a complete change of mind on the part of the corporation.

In the former communication Mr. Sylvan said: "In fruition of the plans, studies and experiments which I, in my testimony before your commission, described as being under way, I take pleasure at this time in announcing that the Chesapeake and Potomac Telephone Company has concluded to proceed at once with the installation of an automatic telephone system in the District of Columbia.

"As was explained by me, the introduction of this system will necessitate the erection of new buildings to house same for the reason that no space is available in the present buildings. Our plans contemplate starting in the business district and extending into the resident districts. As a result of perfected mechanism, the interchange of system between automatic and manual systems will be fully protected during the transition period. The manufacture of apparatus will be carried on simultaneously with the erection of buildings, so no appreciable delay should ensue."

In the later communication received by the commission, which is signed by R. V. Marye, general attorney, the company says that, when last summer it was confronted with an abnormal demand for increased service, it realized its prime duty was to maintain the integrity of the service, and, accordingly, it brought to Washington its own engineers and other experts to study the situation. They decided the best plan would be to adhere to the manual system.

"The question of introducing automatic and semi-automatic switching devices in Washington was fully considered and rough estimates were made as to the probable cost of such substitutions," it is stated, "which varied all the way from $2,000,000 to $7,000,000, according to the plans and methods to be employed during the hypothetic transition period, all of which involved large expenditures for temporary apparatus which would be abandoned when the ultimate cutover should have been made, and also large expenditures for additions to the manual equipment to preserve the service during and transition period."

The communication goes on to say that during these studies it developed that there was a difference of opinion among engineers and experts as to the relative merits of manual and automatic equipment in solving the problem in Washington under present conditions; "for example, some advocated making the start at the central offices, while others advocated making the start at the substations, particularly at the private branch exchange stations.

"Taking into consideration the necessity for maintaining the integrity of the service during the present stress of war conditions," concludes the report, "and considering the divided counsel of engineers and experts with the wide variation in the estimates of the probable resulting cost of making radical changes in the character of equipment, and, moreover, having in mind the injunction of the federal government against the unnecessary expenditure of money, the company is of the opinion that the present is not the time to take chances in making radical changes in the character of its equipment, and that the wise, safe and economical course is to adhere to the present system of so-called manual operation, which after long experience in actual operation had demonstrated that it can render adequate, safe and reasonable telephone service in the District of Columbia."

Many questions asked by the commission related to automatics, all of which, the company says, it cannot answer for the reason that it does not propose to install automatics.

BY HERBERT S. HOUSTON

Member of the Chamber of Commerce of the U. S. A. on Economic Results of the War

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Chapter IV—American Business and the League of Nations

AMERICAN business men had gone on record in favor of economic pressure over two years before the referendum, already outlined, was submitted to vote. In fact, economic pressure has its place in the League of Nations program through their support and approval. President A. Lawrence Lowell of Harvard University, it is interesting to recall, raised the question, when the proposals of the League to Enforce Peace were being formulated in Philadelphia in June, 1915, as to what effect economic pressure could have had as a deterrent force against Austria. And the author undertook to state briefly the ground for believing that that pressure would have been strong enough to have compelled Austria to present her case against Serbia for a hearing—the ground that has been traversed, and somewhat expanded, in the first chapter.

The third proposal of the League platform of principles was under discussion, the one having to do with the sanctions to put behind a court. After full agreement had been reached on the use of military power as a sanction, I proposed, as a representative of the Chamber of Commerce of the United States, that economic pressure be made a preliminary sanction, in the third plank of the platform, to be followed by military power as a final sanction. This view was supported by Philip H. Gadsden of Charleston, my colleague on the Platform Committee, in representing the Chamber of Commerce, and it was embodied, in a modified form, in the third proposal, as follows:

The signatory powers shall jointly use forthwith both their economic and military forces against any one of their number that goes to war, or commits acts of hostility, against another of the signatories, before any question arising shall be submitted as provided in the foregoing.

My purpose in following this economic pressure proposal from its introduction, through its first and then into its final form, in the platform of the League to Enforce Peace, is to make clear and to emphasize the point that this distinctly commercial sanction, which will affect business profoundly when put into effect, originated with business men, was presented by business men for adoption in the platform of the league, and then ratified by the business men of America in an overwhelming majority when submitted to a referendum by the Chamber of Commerce of the United States. If this be treason to the business of the world the business men of this country must accept the responsibility after prolonged consideration of all the consequences. At the national convention of the Chamber, held in Washington in February, 1915, I had offered a resolution urging "that the next Hague Conference provide as a penalty for the infraction of its conventions, that an embargo shall be declared against an offending nation by the other signatory nations." This was referred to a committee on international affairs that was constituted to consider it, under the chairmanship of Edward A. Filene of Boston. General discussion was going on throughout the country of some new world organization that might follow the war. The American Academy of Political and Social Science considered the question at its meeting in Philadelphia in April. In Cleveland, during May, a World Court Congress was held under the presidency of John Hays Hammond, engineer and business man of international distinction, and all of its sessions were given to discussion of international organization and the establishment of a World Court. Chairman Filene had called his Chamber of Commerce Committee together in Cleveland and the resolution on economic pressure was considered; and a month later, on June 17, 1915, the committee met again, this time in connection with the meeting at Independence Hall in Philadelphia, at which was formed the League to Enforce Peace. The committee unanimously agreed to the presentation before the Independence Hall Conference of economic pressure as a sanction to be employed by the proposed League of Nations. As has been stated, this presentation was made and the sanctions adopted and the third plank included "the combined economic and military powers" of the signatory nations. This provided for the use of these powers concurrently and not in sequence, as the Committee of the Chamber of Commerce urged. But the committee joined heartily in support of the new league and two of its members, later increased to three, were included in the league's Executive Committee, as representatives of business men. Then in an endeavor to enlist the active support of the business men of the country for the programme of the League, the Committee of the Chamber of Commerce of the United States prepared a comprehensive referendum (which follows in the Appendix) on the league's four proposals and this was submitted to the six hundred constituent commercial bodies at that time comprising the chamber. The result was an overwhelming majority in favor of the use of economic pressure and a much smaller majority in favor of the use of military power. With this mandate of the business men of the United States behind them, the three members of the Chamber of Commerce, on the Executive Committee of the League to Enforce Peace Mr. Filene, Mr. Gadsden and myself, pressed for an interpretation of article three that would square with the business men's view as to the place which economic pressure, a commercial sanction, should have in the plan for a League of Nations. And this interpretation was secured by the action of the Executive Committee, which authorized the following:

The signatory powers shall jointly employ diplomatic and economic pressure against any one of their number that threatens war against a fellow signatory without having first submitted its dispute for international inquiry, conciliation, arbitration or judicial hearing, and awaited a conclusion, or without having in good faith offered so to submit it. They shall follow this forthwith by the joint use of their military forces against that nation if it actually goes to war, or commits acts of hostility, against another of the signatories before any question arising shall be dealt with as provided in the foregoing.

It can be definitely claimed, therefore, for economic pressure, in the plan proposed by the League to Enforce Peace, that it stands for the settled conviction, reached after full discussion, consideration and referendum, of the business men of the United States. By them it is submitted to the judgment of the world.

Chapter V—Binding the Modern World Together

IN considering the grounds on which American business men base their belief in the value of economic pressure as a force for the maintenance of peace, it is necessary to present a brief survey of the organization of the modern world. The controlling idea in that organization is interdependence. And the essential factor in interdependence is communication. The agencies for quick communication have become so familiar that their significance, as a rule, is quite overlooked. Beginning with the printing press these agencies have increased in number and speed to the point where there seem to be no longer frontiers of the possible; if there still are, in some souls, they are assuredly being crossed and recrossed. Following the post, by ship and coach and train, came the telegraph by land and sea, the telephone, and then, as capping achievement, the wireless. And with these distributive means of communication the productive means also multiplied, in printing presses, typewriting machines and all kinds of mechanical devices. But even more important, knowledge was democratized, both as effect and cause, in this modern period, and provided endless books and newspapers and all manner of periodicals, besides letters, telegrams and wireless messages, all forms of communication which the agencies of distribution bore throughout the world, near and far. This power of quick communication developed endless relationships, all bearing their part in creating and maintaining a world-wide interdependence. For communication has respected national boundaries no more than the winds of heaven.

It would be interesting to consider here how many forces became definitely international, through this power of communication, but they are too numerous to be considered in detail. At present the character of economic pressure is the one point to make clear. In this modern world business can be broadly defined as its organized commercial life, in the three great divisions of production, distribution and consumption. Business, in each of these divisions, is international. It employs one truly international language, that of figures, understood in every country. Today money is international because it has gold as a common basis. Credit based on gold is international. Commerce based on money and on credit is international. Then the amazing network of agencies by which money and credit and commerce are employed in the modern world are also international. How closely interrelated all these agencies are was shown in a dramatic way when the great war broke. Instantly stock exchanges throughout the world were closed. Moratoriums were declared in nearly every country. This was not due to the fact that the world had suddenly become bankrupt, but it was due wholly to a breakdown of the machinery through which the business world carried on its affairs. In brief, it came from a breakdown in the agencies of international communication. The world-wide disturbance that was immediately caused threw into high relief the fact that all nations had been bound together, chiefly through the development of commerce, into an interrelated and interdependent organism. It showed to even the most self-centered and self-sufficient country that it was part of a great whole. In that wonderful figure of the Apostle Paul, in describing the early Christian Church, "they were members one of another." Not one among them, however strong, could stand alone. It is the growing understanding of this fact, which the war has imbedded in the consciousness of the world, that gives the underlying hope for a league of nations.

As all suffer through war, all must combine to lessen the danger of wars. And that tremendous purpose, to find a sane and practicable way out of war, has become one of the great purposes of the war. As the League to Enforce Peace expressed this purpose in these two graphic declarations: "Make the world safe by the defeat of German militarism" and "Keep the world safe by a League of Nations." And Viscount Grey gave expression to the necessity for such a league in these memorable words: "Unless mankind learns from this war to avoid war, the struggle will have been in vain. Over humanity will loom the menace of destruction. If the world cannot organize against war, if war must go on, then the nations can protect themselves henceforth only by using whatever destructive agencies they can invent, till the resources and inventions of science end by destroying the humanity they are meant to serve."

And the English statesman who preceded Viscount Grey in the Foreign Office, Lord Lansdowne, points out the path, on which the best judgment of the world is centering, that must be followed if that catastrophe is avoided. Lord Lansdowne said, "If the Powers will come under a solemn pact and bind themselves to submit future disputes to arbitration; if they will undertake to outlaw, politically and economically, any one of their number which refuses to enter into such a pact, or to use their joint military and naval forces for the purpose of coercing a Power which breaks away from the rest, they will indeed have traveled far along the road which leads to security."

The leading churchmen of England, headed by the Archbishop of Canterbury, prepared an appeal in February, 1918, which gave the most unqualified support to the League of Nations' programme. "We believe that a new system of international law and authority," said the appeal, "acting through an inclusive league of nations in place of any balance of power, is a condition of a just and lasting peace, particularly as it affords means whereby the fresh demands of national life as they arise can be adjudicated upon and equitably satisfied.

"Accordingly, we hold it to be of the utmost importance, as President Wilson has just emphasized, that such a league should not merely be contemplated as a more or less remote outcome of a future settlement, but should be put in the very forefront of the peace terms as their pre-supposition and guarantee.

"Whether it be or be not practicable, without any slackening of the energy with which the war must be waged, to make a beginning upon the league as regards the Allies and neutrals, even before the peace conference, we do not venture to decide, though we think this course has much to commend it. But we are sure of the pressing need there is here and now of giving the League of Nations the backing of an organized body of strong conviction; sure, also, that this task offers to the Christian consciousness an opportunity to make its own spirit felt in national policy such as has not occurred heretofore since the outbreak of this war."

This strong and convincing appeal bore, in addition to the signature of the Archbishop of Canterbury, the signatures of the Bishop of Winchester, the Bishop of Oxford, the Bishop of Southwark, the Bishop of Peterborough, the Rev. Dr. James Cooper, Moderator of the Established Church of Scotland; the Rev. Dr. W. B. Settle, the Rev. Dr. J. Scott Lidgett, the Rev. Dr. F. B. Meyer, the Rev. Dr. D. S. Cairns, the Rev. Dr. J. Estlin Carpenter, the Rev. Dr. Alexander Connell, the Rev. Father Plater, Lord Henry Bentinck, Lord Parmoor, the Rt. Hon. Arthur Henderson, George Lansbury, Arthur Mansbridge, Professor A. S. Peake, and Principal T. F. Roberts.

The support for the League of Nations plan in America has been as influential and widespread as in England. President Nicholas Murray Butler of Columbia University in an address before the Chamber of Commerce in St. Louis, February 16, 1918, said:

"A league to establish and to enforce the rules of international law and conduct is now in existence, with the United States as one of its most potent members. This league should be a permanent addition to the world's organization for order and for peace. Upon its firm establishment three consequences will almost necessarily follow. First, there can be no separate alliances or ententes of a political or military character between na-

tions included in the league, and this league must aim in time to include the whole civilized world. Second, there can be a speedy reduction of armaments, both to lighten the burdens of taxation and to turn the minds of the nations away from international war, to prevent which will be such a league's chief aim. Third, the most favored nation clause must be made applicable to all members of the league whenever treaties of commerce are concluded between any two or more of the nations that are included in it. This will either greatly lessen or wholly remove one of the strongest economic temptations to international war."

As indicating how generally the responsible opinion of the world has centered on this program, these words of President Wilson are significant because they restate his unchanging belief in "the partnership of nations which must henceforth guarantee the world's peace. That partnership must be a partnership of peoples, not a mere partnership of governments."

Chapter VI—Free Seas and Closed Seas

PRESIDENT WILSON in his notable statement of the war aims of the United States, in his address to Congress January 8, 1918, to which reference has been made, presented an exception to the free use of the seas, which reveals a universal agency for enforcing economic pressure. "Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and in war" he declared to be one of our aims, with this pregnant qualification, "except as the seas may be closed in whole or in part by international action for the enforcement of international covenants."

This exception offers a wide range for the effective employment of economic pressure. The seas are the great highways of commerce. For centuries they were infested with pirates, corsairs, buccaneers, all manner of ocean bandits. Nations made common cause against them, but they were not swept from the seas until a century ago. And even then a form of legalized piracy, privateering, was sanctioned as a war measure and continued until a comparatively recent period. But all the time commerce was expanding and its claims for protection were being asserted. At the Paris Conference of 1856, Lord Clarendon agreed for Great Britain, then, as now, the greatest maritime power, in these four declarations:

(1) That privateering should be abolished.

(2) That a neutral flag covered enemy goods, except contraband.

(3) That neutral goods, except contraband, were not liable to capture unless under an enemy flag.

(4) That blockades to be binding must be made effective.

These declarations, although long unpopular with many influential men and interests in England, marked a great advance in the struggle for free commerce on a free ocean. They were international declarations, agreed upon at an international conference, and asserted the fundamental truth that the sea is an international highway, subject to international control.

But the United States did not adhere to the declarations as they did not concede the American contention that all private property should be exempt from capture by war ships as well as by privateers, in maritime warfare. In the Hague Conference of 1899, Dr. Andrew D. White, head of the American delegation, endeavored to have this exemption of private property established, but it was decided that consideration of the question could not properly be given as the subject was not included in the official program announced when the conference was called. But when the second Hague Conference assembled in 1907 that omission had been fully corrected and at the first session of the Commission of the Conference, to which the question was referred, Joseph H. Choate, head of the American delegates, submitted this country's proposal, as follows:

"The private property of all the citizens of the signatory powers, with the exception of contraband of war, shall be exempt on the sea from capture or seizure by either the armed vessels or the military forces of said powers. Nevertheless, this provision does not at all imply the inviolability of vessels which should try to enter a port blockaded by the naval forces of the said powers, nor the inviolability of the cargoes of the said vessels."

Twenty-one nations supported the proposal, eleven opposed it, one failed to vote and eleven were absent. But among the nations opposed were Great Britain, France, Russia and Japan. Among the nations joining the United States in an affirmative vote were Germany, Austria-Hungary, Italy, Denmark, Holland, Belgium, Norway and Sweden. But no final decision was reached on the question. Mr. Choate said a year later, in an address before the New York State Bar Association, "It was not possible, in the face of the great commercial nations that opposed it, nations likely at any time to be engaged in war, to press the question further."

Now, under the stress of war, President Wilson has revised this American proposal. It still stipulates absolute freedom of the seas but it carries the important amendment that the seas may be closed in whole or in part "by international action for the enforcement of international covenants." In fact that is precisely what has occurred during this world war. The seas have been "closed in whole" to the commerce of Germany and the Central Powers through the international action of the nations of the Entente; and this action has been taken in order to enforce "international covenants" because of treaties broken and public law spurned by Germany and her allies. And the result has been economic pressure of the most drastic character. The ocean-borne commerce of the Central Nations has been not merely reduced but destroyed. Their ships are ininterned in hostile ports of all the seven seas. Even the lawless submarines, while damaging the commerce of their foe, have not helped their own. And these are all acts of war in a time of war. Manifestly should the freedom of the seas be abridged through the joint action of a league of nations, to enforce "international covenants" against a nation that had broken a covenant, the resulting economic pressure would be of overwhelming severity. No nation, however powerful, could withstand it for a long period; especially when many kinds of economic pressure were being applied at the same time, through all the other international agencies that have been described.

Chapter VII—Napoleon's Decrees and the Kaiser's Submarine

WHEN Napoleon was struggling for the mastery of Europe, in the early years of the nineteenth century, much as the emperor of Germany has been struggling for it during the early years of this century, he saw that his most determined and stubborn foe was England. And then, as now, the ocean-borne commerce of England, in relation to the commerce of the world, was tremendously large. Manifestly the way to strike hard against the island kingdom was to strike her commerce. Napoleon struck through an embargo and William II through the submarine. In the Berlin Decree of 1806 Napoleon declared a drastic prohibition against all trade with Great Britain. This was immediately answered from London by retaliatory Orders in Council forbidding trade with France. Napoleon, not to be outdone, promulgated his famous Milan decree, making lawful prize of all vessels submitting to British search or taxation. These decrees, for both England and France, were definite acts of war,

and were so intended. But to a nation across the ocean, the young republic of the United States, they were also, in effect, acts of war, although this country was a neutral.

In 1807 the United States adopted an embargo in an endeavor to protect its foreign trade through compelling England and France to either make less restrictive or abolish altogether their repressive commercial policies. This purpose was declared by the Government when it proclaimed the embargo, it being officially stated that it was believed that "by teaching foreign nations the value of America's foreign commerce and production, they will be inspired with a disposition to practice justice."

So one hundred and ten years ago this country undertook to apply economic pressure to accomplish an international purpose, that of justice. And looking back at the results, with the advantage of a perspective of over a century, it is entirely clear that we failed in our aim. Neither England nor France was forced through our action to change its drastic commercial policy. In fact, the chief sufferer was this country itself. Our foreign trade fell off from $108,300,000 to $22,400,000 in a single year. Channing, in making a survey of our endeavor to apply economic pressure, says in his "Jeffersonian System": "The Jefferson-Madison policy of war through commercial restriction had not worked well in practice. And when our minister to England, William Pinkney, took up with George Canning, the British prime minister, the matter of lifting the embargo, he had to bear the biting but probably true statement that Canning would be glad to facilitate the removal of the embargo as a measure of inconvenient restriction upon the American people." There were other acts in the way of non-intercourse legislation, embargoes and endeavors at commercial reprisal adopted by this country both before and after 1807. But this one example is typical of all the others. So it can be presented as a historical precedent and the claim freely admitted that it does not prove the case for economic pressure. Nor, on the other hand, let it be definitely stated, does it disprove the case. It is only necessary to make the most hurried survey of the conditions surrounding the American embargo of 1807 to see that they were such that economic pressure could not possibly avail to accomplish the purpose this country had in mind in undertaking to apply it.

But eighteen years had elapsed since we had adopted the federal constitution. The thirteen colonies that had been in the old federation were members of the new nation, struggling toward unity and some semblance of collective action. Our commerce was important chiefly to ourselves, as Canning truly intimated. To interdict it, struck a heavy blow at the manufacturing of New England and New York and Pennsylvania, then in its infancy, and produced no compensating result.

But this embargo of 1807 and other similar embargoes of the time failed to inspire other nations "with a disposition to practice justice" because they were not powerful enough. For the same reason Napoleon's Berlin and Milan decrees failed. And for the same reason the British Orders in Council failed. But these failures, by throwing into high relief the cause of failure, reveal the one sure ground on which economic pressure must be based in order to succeed. It must be strong enough to be effective, otherwise it is futile. And the whole case for economic pressure in the program of a league of nations is grounded on the fact that international economic pressure, applied by a league of nations, would be effective against any other nation, however strong that nation might be.

There is another manifest difference in the conditions surrounding economic pressure a century ago and those that would surround economic pressure now. Then instantaneous communication, the very spirit and heart of modern world organization, did not exist. It took many weeks to cross the ocean in sailing ships. Even on land there were no facilities, save the slow-moving coach, to bear mail pouches with their infrequent letters. Under the heavy handicap, which the archaic machinery of communication imposed, it is not improbable that these embargoes of a century ago would have failed, even if the United States had been at that time a nation of great commercial power and consequence. So that this precedent, so often referred to, could not fairly be considered to have either binding effect or much illumination for our guidance today.

There are two other historical examples, however, that may have some point and interest in the present discussion, although they cannot be said to present cases parallel with the one that will exist when a league of nations is constituted. When the great armada was being formed by Philip of Spain, the merchants and bankers of Genoa were persuaded by the merchants of London to withhold credit and moneys from the Spanish king. This financial pressure was sufficient to delay the attack of the armada for over a year and by that time Sir Francis Drake and the captains of Elizabeth were ready to meet the shock. It would seem fair to say that what could be accomplished three centuries ago, against a nation as powerful as Spain then was, might certainly be accomplished against any nation today through the concerted application, not merely of financial pressure but of all forms of economic pressure through a concert of nations in a league.

Another example that may bear some information of service belongs to the present century and to so recent a warlike incident as the dispatch by the German emperor of the gun-boat to Agadir, thus bringing on the acute crisis with France with the imminent probability of general war throughout Europe. While that crisis was at its height, I chanced to be in Paris and was having luncheon one day with a young French banker of the Credit Lyonnais. I remarked on the fact that the crisis seemed to be a trifle less acute and inquired the reason. "We are withdrawing our French investments from Germany," was the rejoinder, "and that economic pressure is relieving the situation." Presently the press of the world was commenting on this pressure which France was applying against Germany and there seems to be no doubt that this pressure was the deciding factor in relieving the situation.

In each of these cases, it should be noted, financial pressure was being applied against a single nation by another single nation. But even so, the result strongly supports the view that when this force is applied by a group of nations against a single nation pressure would prove to be irresistible.*

*Embargoes were used as a means of redress by the United States in 1794 (30 days), 1797, 1807 (27 months), 1808 and 1812 (2 years).
Commercial intercourse with France was suspended by an act of Congress of June 13, 1798, and other acts of similar character followed.
Commercial intercourse with Great Britain was suspended by an act of Congress of March 1, 1809. The act was revived on February 2, 1811.
Commercial intercourse with Dominician parts was suspended by act of Congress of February 28, 1806.
The United States Congress in 1887, by way of reprisal, passed an act empowering the President to deny Canadian vessels entrance to American waters and to deny entry to Canadian products, if American fishing rights should be denied or abridged in Canadian waters.

(To be continued.)

European Telephone Practice

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

ARTIFICIAL LINES.—The artificial line so useful in telephone work and telephone laboratory work, also known under the name "H-line," is a patented invention. The constants of this line are adjusted in such a way as to make it represent a natural telephone line, assumed for the sense of the two frequencies determined. Is the "H-line" scheme the only one which allows the reconstruction of a natural telephone line, and what would be the result of this method if the line, instead of being a simple telephone line, were a more complex circuit? It will be seen in the following article that the scheme of the artificial line can be constructed with the aid of a Wheatstone bridge or with any other disposition at one's command, provided care is taken to make the adjustment of the branches of the circuit for the frequencies that are necessary to consider; it will be seen that the "H-diagram" is not at all the only solution.

The question of the construction of artificial test lines has always been of the highest importance for technical research. Attempts were made first of all to imitate the telegraph lines. In contrast to telephone lines, the telegraph current is characterized by the sudden closing and entering into the circuit of a constant electromotive force. It will be necessary to some extent also to examine the behavior of the current and of the potential during the variable period which precedes the more constant one. Among the men, who studied artificial lines as related to the telegraph, the French scientist Vaschy must be mentioned first. Since those days the application of artificial lines has been more to the alternating currents used in industry and to the telephone lines. The industrial currents have usually a definite pulsation. For telephone currents as a rule 5,000 is taken as a standard. However, it is usually managed to have the artificial line, at least in its essential qualities, very close to the qualities of a real line of definite measurements, having two pulsations, including between them the frequency $\frac{5000}{2\pi}$

It is along these thoughts that M. Breisig has imagined his "H-line," which is used in quite a number of laboratories and which is built up somewhat after the diagram of Fig. 1.

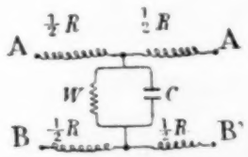


Fig. 1. Diagram of an Artificial "H-line" for Telephone Work.

It has been frequently assumed that the "H-line" is a disposition of some exceptional type, by whose means one can succeed in imitating the phenomena that take place on a homogeneous line. It will be shown that this is not at all the case.

As a matter of fact one can, if one wishes, employ a Wheatstone bridge; one can even employ any kind of arrangement that is convenient, allowing only one reservation which will be shown to apply to the case of homogeneous lines. In the following case use will be made of imaginary notations. The current being, for example the real part of the expression $Ie^{\omega t\sqrt{-1}}$, the quantity I, which itself is a well defined quantity, will in this case be called the vector current, or still simpler, the current. The like will be done for the potentials. These things being so, let AB and $A'B'$ be the ends of any telephone line, and let us assume a determined pulsation ω.

Let I be the current which enters at A and leaves at B; let I' be the current which leaves at A' and re-enters

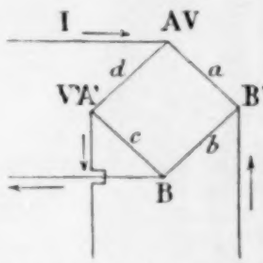


Fig. 2. Scheme of an Artificial Line, Using a Wheatstone Bridge.

at B'; let $V = V_A - V_B$ be the difference of potential between A and B, and let $V' = V_{A'} - V_{B'}$ be equal to the difference between A' and B'. We know then that we have: (1) $V = A_1V' + BI'$

$$I = A_2I' + CV'$$

with (2) $A_1A_2 - BC = 1$, and if the line is homogeneous, we have $A_1 = A_2$.

We will show first of all, that if between the points AB on the one hand and the points $A'B'$ on the other hand, we have a disposition to which we can apply the Kirchhoff law, that we will always have the equation of the form (1) and that the condition (2) is always satisfied.

To demonstrate this, we will divide up the equations as follows:

$$E_i = \frac{1}{2}\frac{\partial J}{\partial x_i}, \quad (i = 1, 2 \ldots n).$$

In these equations we suppose that the intensities of current are all expressed by means of the Kirchhoff equations $\Sigma I = o$, relative to the various current peaks, as functions of n. The flow x_1 is that of a closed wire, the distribution of currents being solenoïdal, and E_1 in the algebraic sum of the electromotive forces encountered along the length of the circuit corresponding to this wire. As to J its algebraic expression is that which would give the heating in Joules $\Sigma R I^2$, if the resistances, instead of being imaginary as we suppose them to be, were real.

Here within the interior of the Kirchhoff diagram considered, we will now suppose that we have no electromotive force. Then all the E's will be zero. There will be exceptions, however, for two wires which we will call x and v; the one enters at A and leaves at B, and the other goes out at A' and returns at B'. We will then have to take account of the equations $V = V_A - V_B$ and $V' = V_{A'} - V_{B'}$. The equations to be solved in order to

find the currents will then be: $V = \frac{1}{2}\frac{\partial J}{\partial x}$ $o = \frac{1}{2}\frac{\partial J}{\partial z}$

$$-V' = \frac{1}{2}\frac{\partial J}{\partial y} \quad o = \frac{1}{2}\frac{\partial J}{\partial u}.$$

Without making any restrictions in application, we can limit ourself to the case of four variables of independent order and the equations will then be written:

$$V = ax + by + cz + du,$$
$$-V' = bx + a'y + ez + fu,$$
$$o = cx + ey + a''z + gu,$$
$$o = dx + fy + gz + a'''u.$$

What we want is V and x as functions of V' and of v. We will therefore write

$$-V + ax + cz + du = -by,$$
$$bx + ez + fu = -a'y - V',$$
$$ax + a''z + gu = -ey,$$
$$dx + gz + a'''u = -fy,$$

The constants form a table of determinants. In order to simplify matters, each determinant is shown with its diagonal between the parentheses:

$$(b\,a''\,a''') = \begin{vmatrix} b & e & f \\ c & a'' & g \\ d & g & a''' \end{vmatrix}.$$

Under these conditions, solving relations of V, x, z, u, we have the following:

$$V = -\frac{(a\,a''\,a''')}{(b\,a''\,a''')}V' - \frac{(a\,a'\,a''\,a''')}{(b\,a''\,a''')}y,$$

$$z = -\frac{(a'\,a''\,a''')}{(b\,a''\,a''')}y - \frac{(a''\,a''')}{(b\,a''\,a''')}V'.$$

Now the theory of determinants shows us that we have: $(a\,a''\,a''')\ (a'a''a''') - (ba''a'''')^2 = (aa'a''a''')\ (a''\,a''')$. This meets condition (2). It is therefore always satisfied and is not at all a particular characteristic of the Breisig "H-line." In order that we may draw the same analogy for a homogeneous line, we must have conditions expressed by the equation: $(a\,a''\,a''') = (a'\,a''\,a''')$. We can show a remarkable confirmation of this theory in the particular case of the Wheatstone bridge, as shown in Fig. 2.

It will be seen that a Wheatstone bridge is used to obtain conditions identical with those obtained with the "H-line." We have in effect:

$$V = \frac{(a+b)\ (c+d)}{ac-bd}V' + \frac{ab(c+d)+cd(a+b)}{ac-bd}I'.$$

$$I = \frac{(a+d)\ (b+c)}{ac-bd}I' + \frac{a+b+c+d}{ac-bd}V',$$

as calculations show without trouble, with $V = V_A - V_B$ and $V_A' - V_B' = V'$. The other conventional signs and details are clear from the figure. We have then:

$$(a+b)\ (c+d)\ (a+d)\ (b+c) - (a+b+c+d)$$
$$(ab\ (c+d)+cd\ (a+b)\ ) = (ac-bd)^2,$$

equations, which have been proposed quite a number of years back by French electrical engineers. The condition under which one has the image of a homogeneous line is: $(a+b)\ (c+d) = (a+d)\ (b+c)$, or: $(b-d)\ (c-a) = o$. That is equivalent to saying, let $b = d$ and let $c = a$.

From the discussion it will be clear that the quadrilateral line shown is no more complicated than the H-line.

Summing up, it has been shown, that between the points of entry AB of any system of electrical conductors and the outlet ends $A'B'$ we have the relations (1) and that the condition (2) is always satisfied, and that finally the H-line disposition can be replaced by a quadrilateral system, which will give the same result with as little trouble.—J. B. Pomey, telegraph and telephone engineer, *Revue Générale de L'Electricité.*

The Location of Defects in Underground Cables

THE author of this article describes a method whereby he has succeeded in locating defects and leaks in underground cables with three conductors accurately within 15 feet of the defect. At the time when the author first worked out this method, cable systems had not been perfected to the point at which they stand now and the location of defects was much more important, if more serious trouble was to be avoided. In a lead sheathed cable with three conductors the break usually comes between a conductor and the lead sheath. At the present time where telephone cable systems are well protected by cutouts in case of accidents of this kind, the danger of a complete break-down of the cable system is very remote. As a rule a break is located early enough and repairs are made before the copper of the other conductors is affected and in most cases it is found that the insulation of the neighboring conductors is not even touched.

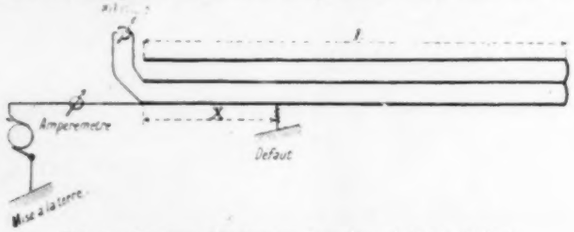


Fig. 3. Diagram Illustrating Location of Cable Defect.

The damaged cable usually terminates in an exchange or in some electric station where direct current can be obtained, whether it be from the exciters for the alternators or the electrical apparatus used to charge the batteries, or from a group of batteries. It is necessary for the success of the method to be described that a good ground be obtained for the defect. This is done, if the insulating resistance still is high and if the cables are of high tension, by keeping the tension up long enough to burn the insulation and bring about the forming of charcoal and drippings of copper and molten lead, establishing a contact of low resistance which will allow the passage of direct current for the measurements. The same result can be obtained in a much simpler way with a Delon contact. At the extremity of the cable the conductors are connected by a copper bar of fairly heavy cross section and provided with good contacts.

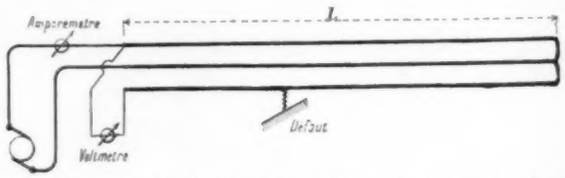


Fig. 4. Diagram to Obtain ρ (resistance of a conductor per unit length).

One of the poles of the direct current source is connected to the ground, and the other by way of an ammeter to the broken conductor, as Fig. 3 shows. The current is then carried by the section of the broken conductor to the defect, then to the earth, closing the circuit with

the other pole of the current source. In order to increase the accuracy of the measurements as strong a current as is feasible should be used.

A voltmeter is connected between the ends of the broken conductor and one of the other conductors. The latter and the second section of the broken conductor play the role of a pilot wire of absolutely negligible resistance compared to that of the voltmeter which will indicate the fall of tension from the end of the conductor to the defect. The ratio $\frac{V}{I}$ is equal to the resistance of the section whose length X we seek; then $\frac{V}{I} = X\rho$ and $X = \frac{V}{I\rho}$, ρ being the resistance of a conductor per unit of length.

In order to determine accurately the value of ρ under actual working condition: having found out the section of the conductors, the temperature, the accuracy of the test instruments, etc., we connect the two poles of the direct current source to the ends of two sound conductors and connect the voltmeter between one of these ends and the end of the damaged conductor, following the diagram shown in Fig. 4. We have then $\frac{V_1}{I_1} = R_1 = \rho L$, and $X = \frac{L.V.I^1}{V_1 I}$. This method of measurement is absolutely exact and eliminates all causes of error, whether it be errors in measuring the resistance of the defect, or one due to the inaccuracy of the measuring instruments, the temperature of the conductor, etc.

X having been determined, this point is traced on the plan of the network of cables, the two junction boxes located within a circle drawn about the point X and these boxes opened. Again the three conductors are connected to the end furthest removed from the station or the exchange and the same test is repeated from the other extremity of the length of cable, confining the defect. Dirct current being received from the station through the conductors of the cable whose junction box is open, we obtain as before: $X = \frac{l.v.i_1}{v.i}$ l being the length between the two open junction boxes. Then the length x is measured along the surface over the road the cable takes and the conduit is opened at that point. In laying bare the cable for a certain distance each way, the damaged point is usually located without trouble. An added help is to let the current pass to the ground connection at the defective place, noting the heating effect caused. Repairs can then be made rapidly. The only case where this method cannot be used is where the damaged conductor is divided into sections and is insulated from neighboring conductors, but this type of defect is quite rare. In the numerous locations which the author has made within the last eighteen years, he has usually succeeded in locating the defect within less than 15 feet. Often this method has succeeded where the usual laboratory methods failed.—L. Congé, electrical engineer. *Revue Générale de l'Electricité.*

Castelli Apparatus for Simultaneous Telegraphing and Telephoning

THE present article which was written by an Italian engineer treats the simultaneous use of telegraph wires for both telegraphing and telephoning messages. Only one single wire is used to carry the current and the return is made through the ground. If the telegraph wire is not subjected to induction influences, the solution of the problem is simple enough and the apparatus may consist of the usual telephone instruments mounted in shunt over the telegraph circuit, making use of a condenser and of an inductance placed in series on the line between the telephone station and the nearest telegraph station, as shown in Fig. 5.

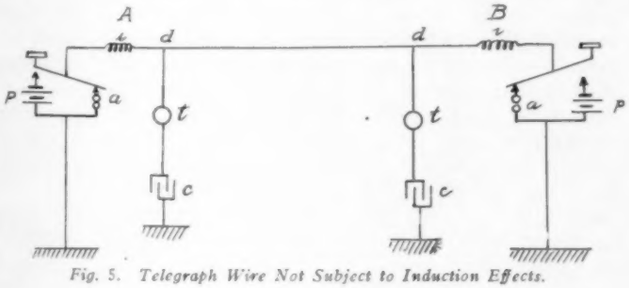


Fig. 5. Telegraph Wire Not Subject to Induction Effects.

Let us suppose that the inductances i and i_1 are of no effect; if we press down on the key at A, the point d, very close to the battery, is brought at once up to the potential of the entire system, while the point d_1, further removed from the battery, reaches this potential somewhat later, on account of the capacity of the line. The pressing down of key A will therefore cause the instantaneous charging of the condenser c by way of the telephone t and the gradual charging of the condenser c_1 by way of the telephone t_1. The telephone t will experience a slight noise, while telephone t_1 will remain silent. The permanent passage of current having been brought about, the pressure on key A is released; all the points on the circuit will then return to their zero potential. The same is true of the armatures of the two condensers; but owing to the impedance of the telegraphic apparatus, which under these conditions finds itself within the circuit, the two telephone stations will remain silent and cannot communicate. Consequently if we desire the current charges from the telegraph system to cease from interference with the telephone equipment, we will have to interpose the two inductances i and i_1.

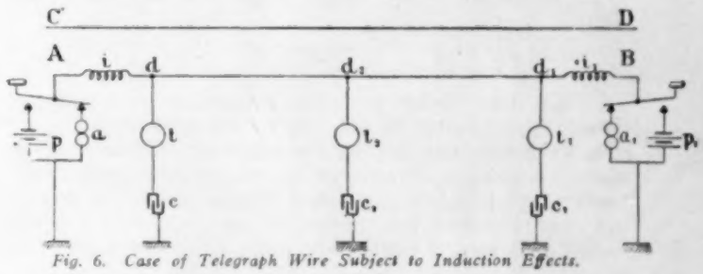


Fig. 6. Case of Telegraph Wire Subject to Induction Effects.

The diagram drawn in Fig. 5 would allow telephonic communication over a telegraph line which is not subject to induction influences, but the calls would have to be made with an alternating current of a frequency higher than that furnished by an ordinary magneto, so as to

avoid the actioning of the telegraph instruments. It is now easy to take account of the action that takes place when the telegraph wire is placed parallel to another wire *CD* as shown in Fig. 6.

When *C* sends a current into the wire *CD*, the latter has during the first few moments a maximum value at *C* and a low value at *D*. In *AB* there are set up electromotive forces of induction which are maximum at *A* and feeble at *B*. The telephones *t* and t_1 are the seat of phenomena analogous to those in the preceding case, when we pressed down on key *A*, without inductances *i* and i_1 being interposed. Besides, the wire *CD* might represent the entire wiring plan for a telegraph system placed on the same pole as wire *AB*, the electromotive forces of induction being localized towards the two extremities of *AB*. There follows then naturally, if we introduce a third telephone t_2 in shunt over *AB*, that the telephones *t* and t_1 will be the seat of strong disturbances, while the telephone between them, t_2 will be less disturbed. When introducing inductances over all the wires *CD*, it will be

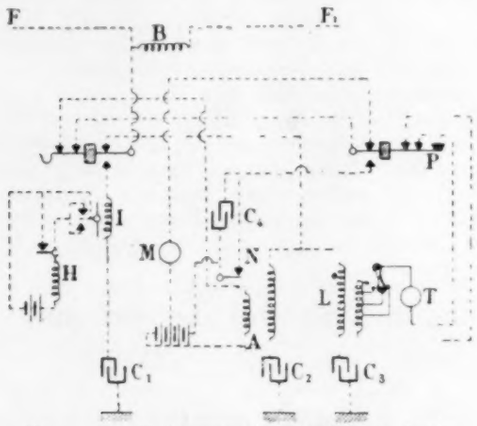


Fig. 7. Castelli Apparatus for Simultaneous Service.

possible to reduce the disturbances caused in *AB* to a minimum limit. This method is the basis for the first simultaneous telegraph and telephone system invented by Van Rysselberghe in 1883. A simpler solution is presented by the system Perego and Brune-Turchi, which bases its claim on the reaction brought about upon the disturbing currents induced into the wire *AB*.

The two Italian inventors just mentioned have adjusted these latter to an alternating current of a frequency lower than that of the telephone system and have then worked out current paths and systems permitting a separation. Castelli, the latest of engineers who worked on this problem has perfected two systems, one for small distances, the other for more extensive work. We will confine ourselves here to the description of the larger and more useful apparatus, illustrated in Fig. 7.

Calling of subscribers is accomplished by bell signals and the receiving of these signals is done through means of a separate box. The signals are given by means of an

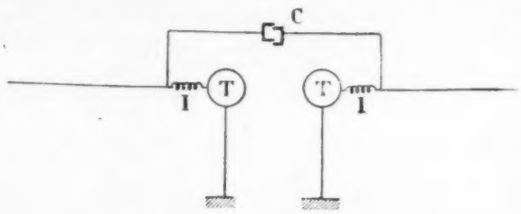


Fig. 8. Connection for Simultaneous Service on Telegraph Lines.

arrangement made up of a step-down transformer L_1. The condenser C_3 prevents shunting of telegraph circuits to ground. The number of turns of the secondary of the transformer can be modified according to the induction effect.

The transmission of speech is accomplished by an arrangement analogous to that of the ordinary telephones. Calls are made by means of an alternating current of 100 periods per second obtained by a vibrator *P*. In the receiving instrument the call current passes over a polarized relay *I* with high inductance and goes to the ground by way of the condenser C_1.

The armature of the relay is set to vibrate and produces an intermittent contact which calls forth the operation of a direct current bell signal. The high inductances of the receiving parts of the call instruments allow the installation of several instruments on the line without any sensible disturbances. The entire system has been simplified still more since its first appearance in practice. It has been tried out on the Italian telegraph lines between such important centers as Naples and Rome, averaging distances of 250 km. (150 miles) and other shorter distances where instead of bronze wires, iron wires were used. The advantage of this system was found to lie partly in the possibility of connecting places that formerly had no telephone but had telegraph connection by telephone, without necessitating the investment in wire and field equipment so necessary where a telephone line has to be strung. As a matter of fact to pass from one telegraphic circuit to another, all that is needed is a very simple connection shown in Fig. 8. This connection can be set up either on any of the line poles, where the two telegraph lines pass each other or on the lines themselves at places where the wires are crossed.—*Revue Générale de L'Electricité.*

French Measures to Save Materials

THE shortage of all kinds of materials is gradually becoming so acute in France, that steps had to be taken to eliminate certain materials of construction formerly found necessary and to substitute other means of reaching the same or similar results.

The most recent of these orders to cut out certain materials has struck the telephone field and attempts to eliminate the batteries at subscribers' stations. In Europe the individual battery type of telephone apparatus is still rather common and the common battery system is less established than here in the United States. The technical committee in charge of these matters has issued a decree, asking that the telephone department of the government cease as soon as possible making installation of batteries for new subscribers in telephone systems that use the common battery system, and limit batteries to the giving of call and finish signals. The order will result in the admission of the c. b. system on government telephone lines.

To reduce the upkeep expense and provide spare

parts at immediate notice, the government will have the new type of apparatus made as standardized as possible. The type to be adopted will have an interchangeable hook switch, whose dimensions will be announced later. The receivers and transmitters and the microphone parts are also to be of standardized make. To save on installation costs, the government will either have to equip subscribers with the new apparatus or else make them buy the new type, containing the call signal apparatus within the same wall box set as the transmitter and receiver, or else in a separate small box, connected to the telephone by a flexible cord.

The same effort to eliminate call batteries is also being made in the telephone exchanges themselves. The call batteries of telephone exchanges where the older non-multiple switchboards are still used will be immediately equipped with magneto call apparatus, whose crank will be placed on the right hand side of the switchboard. The result of this measure will mean a certain increase in work for the operators, but these are war conditions and many things are necessitated by the war, not done in normal times.

In those places where there is an electric lighting system, using alternating current of the ordinary type or

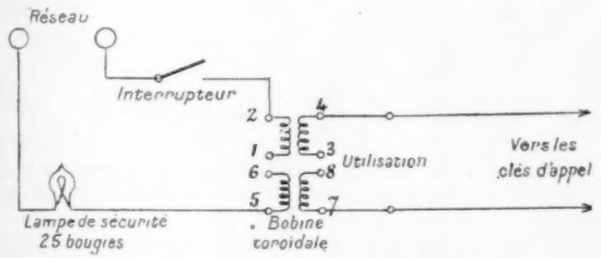


Fig. 9. New Call System in French Telephone Exchanges.

triphase current at 42 periods, it will be possible, moreover, to utilize the industrial currents to call the subscribers to their telephones. The work of the operators here will not be any more increased. The disposition to be used, shown in Fig. 9, consists of a small static transformer in form of a standard toroïdial coil, protected by a safety lamp of the old metallic filament type, of 25 c. p., fed from the normal lighting voltage. The diagram is shown in the figure and the calling is done as formerly without any change whatever.—*Annales des Telephones.*

Wireless and the Germans

From various sources it is gathered that Government agents have discovered certain German agents making use of wireless equipment in the New England section of our country. According to one report, these alien enemies make use of indoor aerials, while another hints at the use of aerials in wooded localities and connected with the operators some distance away by means of discarded or little used telephone wires. All of which is quite plausible as far as receiving wireless messages is concerned. However, when it comes to transmitting wireless messages, the chances are that either of these systems would be of little value. It requires only a small aerial to receive signals from the powerful German stations, provided the best of apparatus is available, and this fact was mentioned in these columns when our country first went to war. Indeed, it would seem almost impossible to prevent the enemies in our midst from receiving messages from abroad because of the ease with which an aerial can be concealed, save by a house-to-house search. But as concerns the transmission of messages to tramp steamers or U-boats operating somewhere off our shores, the size and efficiency of the aerial required must needs lead to detection in short order. And it is the transmission rather than the reception of intelligence that constitutes the greatest menace to us.—*Scientific American.*

Auto Transportation in France

What the motor truck and car can accomplish as a means of wholesale transportation is being demonstrated daily in France by the American Red Cross Fleet of 634 vehicles. These not only handle an average of 2,500 tons of freight monthly at fourteen ports, move nearly a thousand tons per week from the Paris stations and the Seine landings but transport supplies, workers, refugees and wounded in all sections of France not omitting those parts under shell fire. If a hospital suddenly wires in that it needs emergency supplies, if a car or truck will get them there quicker than will a train, the load goes with a Red Cross driver. If a German drive threatens a village, Red Cross trucks are there to move the civilians and their belongings to a point of safety or hasten them to refugee trains waiting at distant stations. The ambulances may assist with wounded soldiers on their way back to base hospitals or may answer a call from a bombing raid to help uncover and remove the wounded. Trucks, ambulances and cars all serve at times as passenger vehicles. In two months they answered 2,528 calls to move people in Paris alone—many of them being refugees to be taken from one railroad depot to another. In a single week there were 233 city calls, 130 for journeys outside of Paris and 47 cars were sent for prolonged duty near the army lines.

Of the fleet, 385 are trucks and ambulances, 246 ordinary cars and 22 motor bicycles. To keep the fleet moving, the Red Cross maintains two large garages and an automobile park in Paris. Fifteen other garages meet the needs of the port and other transportation services. Complete machine shops with skilled mechanics are maintained at the chief garage.

Speed in handling goods at the ports is an essential and the Red Cross drivers are rather proud of moving 300 tons from one landing in a single day. A single cargo of 38,000 cases weighing 980 tons was handled with similar speed by the gasoline transportation corps. The goods platform at Paris may contain 15,000 cases at a time.

Over 80 per cent of the Red Cross supplies have to pass through the capital on their final journey of relief. Practically every article shipped via Red Cross from America, whether a baby's sock, a case of bandages or a complete hospital equipment is handled at some point in one of these cars.

Conscripted Cable

A couple of months ago the Nebraska Telephone Company received a carload of cable for use in repairing and enlarging the North Platte plant. The big reels had been unloaded but a short time until the federal government commandeered a reel. This was followed by the commandeering of another reel, and reel followed reel until the entire carload has been conscripted for government use.

In 1850 the first experiments in submarine telegraphy were made by the laying of a cable between Dover and Calais, England.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

California

THE state railroad commission hearing July 8, in San Diego, for the application of the local telephone company to charge a 10-cent toll rate between suburbs and San Diego was postponed until November 12. Action on the proposed merger of the two systems also was postponed.

The postponement was granted in response to a request by the telephone users who desired time in which to prepare their answer to the representations made by the company. November 12 was the earliest date available on the commission's calendar.

On behalf of several suburban districts where canvasses of sentiment had been made, Attorney H. S. Utley presented petitions purporting to show the sentiment of the telephone users of those districts. The petitions were admitted as evidence, but not read at the time.

Exhibit No. 21 gave proposed rates for San Diego, Chula Vista, Del Mar, El Cajon, La Jolla, La Mesa and Pacific Beach. Exhibit 21A was a counter proposition in which separate rates were made for San Diego, Coronado and National City. Each of these carried proposed rates for measured service as well as unlimited service

In the counter proposition, the San Diego monthly rate for an individual business line, unlimited, would be $6 for a wall set; two-party line, $4.50, with 25 cents added for desk set, in each case. Suburban 10-party line, $3 and $3.25.

Residence service, unlimited, individual, $2.50 per month; two-party line, $2; four-party line, $1.75. Suburban service, 10-party line, $2.50. All the above being for wall sets; 25 cents additional for desk sets.

The proposed Coronado rates for individual business two-party and suburban service are, $3, $2.50 and $3, respectively, with the same additional charge for desk sets. Residence, individual, two-party, four-party and suburban service, respectively, $2, $1.75, $1.50 and $2.50.

The proposed rates for National City in the counter proposition are the same as for Coronado, except for the individual business line and the two-party business line, which are 50 cents lower for National City.

Colorado

The Colorado utilities commission has denied Denver's application for a reopening of the telephone rate case, and, in its written decision, asked the city to go into the Supreme court to determine whether the commission or the city has jurisdiction over rates.

In effect the commission holds that the city's application for a rehearing was based on the question of jurisdiction, which the commission holds rests with it under the act by which it was created. It proposes to go before the Supreme court under one of the sections of this act. The commission says on this question:

"However, the commission is willing, pursuant to section 46 of the public utilities act, and within the time prescribed by the act for the prosecution of writs of review, to enter into a proper stipulation with the city and county of Denver for the purpose of certifying to the Supreme court of this state for its judgment the sole question of jurisdiction raised by the petition for a rehearing."

"Too late" is the verdict of the commission on the question of a rehearing, the state body holding that its grant of higher rates in Denver, and, in some cases, in the state, made on June 14, became effective on that date, and that the decision was therefore final, as far as the commission is concerned.

There is pending in the District court an application by the city for an injunction to prevent the collection of the increased rate by the telephone company. By agreement, the collection of the advanced rate is stayed until the case is decided.

Whether an agreement by the city to go before the Supreme court for settlement of the question of jurisdiction would serve to suspend the increased rate is a question not made clear. City officials have not indicated how they will receive the proposal of the commission, as acceptance would imply dropping the injunction proceedings pending in the lower court.

In giving its decision the commission held that nothing had been brought to its attention to substantiate any charge that the rate increase was unlawful or unreasonable, in the following language:

"The petition for rehearing filed in this cause does not set forth specifically any ground on which the applicant considers the decision and order of this commission unlawful or unreasonable, except insofar as it questions the commission's jurisdiction with respect to the city of Denver."

The order recites that the city filed a petition in rehearing thirteen days after the order issued, averring generally that the commission's ruling was not supported by the evidence.

The commission does not accede to the contention of city officials that Denver is under home rule. Its position is seen in the following:

"Denver is what is commonly known as a home rule city. The special charter adopted by the city purports to grant to such municipality the right to control its local and municipal affairs, and it is contended that in all such matters the powers of the city supersede any law in conflict therewith."

The home rule provision is a constitutional amendment, while the commission is created under statutory enactment.

To the contention that the regulation of telephone rates within the city of Denver is a strictly local and municipal matter, the commission cites a number of Colorado cases in which the question has been considered, and then says:

"In all of the cases this commission has held that its jurisdiction extends to all public utilities within the state of Colorado regardless of whether or not the utility operates within a charter city.

"The Supreme court of Ohio has recently adopted the same view with respect to the powers of the Ohio public utilities commission in a case involving the regulation of telephone rates in the city of Cleveland. Specific consideration was given to the fact that Cleveland is a home rule city.

"It is the opinion of the Colorado commission that the regulation of the rates of the defendant telephone company can in no sense be regarded as a local or municipal matter. Its lines reach to practically every town and locality of the state, and the company therefore is subject to the jurisdiction of the public utilities commission, to the exclusion of any municipality or other body."

To substantiate its claim to jurisdiction as against the home rule amendment, the commission cites the following extract from the court decision in the case of the Portland Street Railway vs. the City of Portland, Ore.:

"Now the right to regulate rates of public service corporations is a governmental power vested in the state in its sovereign capacity. It may be exercised by the state directly or through a commission appointed by it, or may delegate such power to a municipality, but I do not understand that a municipality may

assume to itself such power without the consent of the state where there is a general law on the subject emanating from the entire state. It is true that under the Oregon system the legal voters of every city or town are given power to enact or amend their municipal charter subject to the constitution and criminal laws of the state, but this does not authorize the people of a city to amend its charter so as to confer upon the municipality powers beyond what are purely municipal or are inconsistent with the general law of the state constitutionally enacted * * * all authority over the subject must emanate from the state. The effect of the amendment to the charter of the city of Portland is an attempt to ignore the state authority and assume sovereign right superior and contrary to the expressed will of the state as manifested in its legislation. If the amendment is valid and takes the public utilities within the city of Portland out of the operation of the public utility act and the jurisdiction of the commission created by it, then every municipality of the state may amend its charter with like effect and the public utility act will become a useless and emasculated piece of legislation; the will of the entire people as expressed therein be practically ignored, and the will of a part of the state become greater than the law."

District of Columbia

That telephone calls per station per day in Washington show a low average compared with those of other cities comparable to the capital was brought out at the hearing before the Public Utilities Commission to determine whether financial relief should be given the Chesapeake and Potomac Telephone Company.

Dr. F. A. Wolff of the United States Bureau of Standards took the stand to explain data compiled by experts of the bureau relative to the local telephone situation. G. S. Macomber and W. E. Brown, experts of the bureau associated with Dr. Wolff in the investigation, also testified.

Dr. Wolff's testimony largely was taken up with amplifications of the telephone report issued recently by the bureau as a public document. His figures on usage showed that the average call rate per station per day in Philadelphia is 4.33; Baltimore, 4.80; New York, 5; Pittsburgh, 5.05; Boston, 5.37; San Francisco, 5.37; Cleveland, 7.40, and Detroit, 9.80, whereas in Washington it is but 3.3.

He showed that the ratio of flat rate calls to total calls originating in the busy hours of service in Washington is decreasing. In 1915 the percentage ratio was 14.1; in 1916, 12.9, and in 1917, 12.1.

That telephone usage will increase if an automatic telephone system is installed was indicated by statistics given by the expert as to the call rate in Lima, Ohio, where automatics are used. With about 10,000 stations, Lima, he said, has approximately 80,000 originating calls a day, which average about eight calls per station per day, as compared with the less than four calls per station per day in Washington, where the manual system is in operation.

Dr. Wolff's testimony at the morning session related to only a few phases of the bureau's investigation and did not touch upon many of the questions, especially that of the practicability of installing automatics in Washington at the present time, which the government experts will endeavor to clear up for the benefit of the commission before the hearing ends.

Representatives of the telephone company, including President Bethel, T. P. Sylvan, assistant to the president; Attorneys Marye and Swayze of New York, and others attended the hearing. Chairman Brownlow of the commission presided and General Counsel Conrad H. Syme conducted the questioning of Dr. Wolff for the commission.

The operating expense per telephone in Washington in 1917 was three times as great as the average expense per telephone in Galesburg, Ill., Indianapolis, Columbus and other cities where the automatic or semi-automatic telephones are in use, according to the testimony of W. E. Brown, of the U. S. Bureau of Standards.

The operating expense in other cities was approximately $3 a year, Mr. Brown stated, while the expense in Washington in 1917 was $9 a year.

The hearing was adjourned to give attorneys of the Chesapeake and Potomac Telephone Company time to examine exhibits and to prepare to cross-examine witnesses from the Bureau of Standards.

Illinois

Discriminatory toll rates for telephone service between Chicago and some of its suburbs charged by the Chicago Telephone Company must be abandoned and a new schedule of rates filed within ninety days, according to an order issued by the state public utilities commission.

The ruling was based on a petition filed before the commission by Attorney Myer J. Stein of Oak Park, with offices in the City Hall Square building, December 4, 1916, in which Mr. Stein charged that the toll rates between Chicago and Oak Park are exorbitant.

The same ruling takes away from the city council of Chicago the right to fix rates for the telephone company or any other public utilities corporation, according to Mr. Stein.

"The telephone company has been active within the last few months in attempting to secure an increase in telephone rates from the city council," said Mr. Stein. "The ruling positively contends that the city has not right to make rates for telephone service. Incidentally, the telephone company must file a new schedule of rates which cannot be higher than the one now in use. I can see nothing but a reduction in rates for service to Oak Park, Evanston, Cicero, etc., to 5 cents. I used as my argument the point that if Austin can call Oak Park for 5 cents, why is the rest of Chicago required to pay 10 cents for the same service?

"The contention that the city had no right to fix rates was my final point, and on this the utilities commission has ruled."

The state public utilities commission has ordered the Belvidere Telephone Company of Belvidere, Ill., to improve the service it renders its subscribers within sixty days and also denied the petition of the company for an increase in rates.

The commission dismissed the complaint of the Boone County Co-operative Telephone Company against the Belvidere Telephone Company relative to repairing of lines between Caledonia and Belvidere.

The action of the commission follows an investigation of the situation in Belvidere and consideration of a petition filed by the company asking permission to increase its rates. The city of Belvidere, represented by City Attorney Roberts, opposed the matter of a rate increase and a hearing was heard on the subject in Chicago.

The complaint which the Boone County Co-operative Telephone Company lodged with the commission against the Belvidere Telephone Company concerned line trouble in the vicinity of Caledonia which, the co-operative company held, should be repaired by the Belvidere Telephone Company.

The state utilities commission granted to the Ashland Telephone Company the right to increase its rates for service at Ashland and vicinity.

The Mutual Telephone Company of Girard is given the right to place in effect a new schedule of rates at Girard.

The commission suspends the proposed new rates for increased telephone service at Illiopolis, offered by the Illinois Telephone Company.

The People's Telephone Company of Mercer county is ordered to discontinue the schedule of rates and charges that it

now has in effect, known as I. P. U. C. 1, and establish in lieu thereof the following schedule, which shall be designated as I. P. U. C. 2:

Office and business telephones	$2.00	per mo.	$24.00 per year
Single party residence telephones	1.35	per mo.	16.20 per year
Two-party residence telephones	1.00	per mo.	12.00 per year
Residence, more than 2-party, telephones	.75	per mo.	9.00 per year
Country telephones	1.35	per mo.	16.20 per year
Country telephones, special	2.00	per mo.	24.00 per year
Extension telephones—telephones with bell box	.75	per mo.	9.00 per year
Extension telephones—bell box only	.25	per mo.	3.00 per year
Telephone extension—telephone without bell box	.50	per mo.	6.00 per year
Rural switching			5.00 per year
Desk telephones, extra	.25	per mo.	3.00 per year
Local calls from central office or pay booth by non-subscribers in the city			.05 each
Same, country			.10 each

Indiana

The Central Union and Lafayette telephone systems were formally completed July 10 when the petition of Frank O. Cuppy, manager of the local company, for authority to sell $70,000 additional capital stock was granted by E. I. Lewis, chairman of the public service commission. Of this amount $55,000 is to be used in purchasing the Bell properties, $8,000 for making the connections needed, and the remainder for other expenses which may arise. There was no protest to the petitions. Mr. Cuppy hopes to make a temporary connection within a month, although the permanent physical connection cannot be made for some time owing to scarcity of materials. Plans for completing the merging were discussed at a regular board of directors' meeting held July 10. The company's petition stated:

That it has issued and there is now outstanding and existing common capital stock of the par value of $330,000, and there are bonds now issued and outstanding to the amount of $150,000 value, drawing five per cent interest per annum, payable semi-annually, the principal being payable in twenty years from the first day of September, 1902, such being secured by mortgage on all the property of the company, making the total amount of stock and bonds of $480,000.

That the present value of the property of the petitioner far exceeds the value of the stock and bonds outstanding against the company and all other indebtedness against the company.

That it has purchased of the Central Union Telephone Company for $55,000, to be paid in cash, all its exchange property in the city of Lafayette and town of West Lafayette, Indiana, and vicinity with certain toll lines radiating from said city of Lafayette, except the central office equipment and sub-stations of said Central Union Telephone Company; that said property as purchased is of the value of $55,000; that it will require an expenditure of an estimated amount of $8,000 to make the required physical connections between the properties just purchased with that of the petitioner, and other necessary improvements incident thereto.

The petitioner further represents that it has the written consent of the holders of more than three-fourths of the common capital stock of the company for an increase of its common capital stock from $330,000 to $400,000; that such increase when made, added to its present stock and bonds and other indebtedness, will not equal in amount the value of the property of the petitioner.

Maryland

Application was filed with the Public Service Commission by the Chesapeake and Potomac Telephone Company for permission to increase the capital stock of the corporation, which is now only $10,000,000 to $15,000,000, the shares to have a par value of $50.

The purpose as outlined is to provide for the refunding and repayment of advances or demand notes and open accounts; $253,104.07 is to be set apart for the acquisition of the property of the Maryland Telephone Company and $2,411,895.93 is required to conform to the value of the property plus the net addition since the commission fixed a value.

This value was placed in June, 1914, at $13,667,197. The additions amounted to $3,682,872.56, making a total of $17,296,-069.56.

Minnesota

Local telephone service rates will remain unchanged in Minnesota if charges for new installation and moving telephones are permitted to increase revenues, representatives of the big telephone companies indicated at a hearing before the state railroad and warehouse commission for permission to put the proposed special charge schedules into effect.

For new installation or removals of telephones from one location to another charges of $5 in Minneapolis, St. Paul and Duluth, and $3.50 in smaller cities are proposed. For restoring service on installed telephones the charges are to be $4 in the larger and $3 in the smaller cities.

A charge of $1 is proposed in each case where a telephone is moved on the same premises and where service is resumed after suspension for non-payment. Another charge of half rates for services suspended by request is submitted for approval.

Guy H. Pratt, general commercial superintendent of the Northwestern Telephone Exchange Company, told of the expense of moving telephones, publishing new directories and other items to warrant the proposed special charges.

Superintendent G. L. Barry of the Tri-State Telephone and Telegraph Company gave similar testimony to justify the proposed new schedules.

P. M. Ferguson, manager of the Citizens' Telephone Company of Mankato, and other representatives of telephone companies attended the hearing.

It is ordered that the Edgerton Telephone Company and the Woodgate Telephone System shall re-establish within thirty days from July 1 a physical connection of their respective telephone lines at Chandler, Minnesota, by either reconnecting those lines over which the service was previously furnished or by the connecting of clear trunk circuits, to be provided for that purpose upon such terms and conditions as may be agreed upon by the respondent companies, or in the event of the respondents failing to agree, then upon such terms and conditions as this commission may hereafter prescribe upon proper application by either party.

It is further ordered that the Edgerton Telephone Company immediately discontinue the furnishing of free telephone service from the telephone now installed in the State Bank of Chandler.

The Annandale Telephone Exchange Company has filed an application with this Commission for authority to increase its rates for business, residence and rural telephone service within the village of Annandale, county of Wright, State of Minnesota, the proposed rates being as follows:

Individual Line Business	$ 2.25 per month
Two-party Line Business	2.00 per month
Individual Line Residence	1.50 per month
Two-party Line Residence	1.25 per month
Four-party Line Residence	1.00 per month
Rural Multi-party (company owned)	1.25 per month
Season rates for cottages	12.00 per year

Hearing will be held at the village hall in Annandale at 1:00 o'clock on August 2.

At the request of the Watertown Telephone Company, the hearing on the valuation and appraisal of its property, is continued from July 16 to September 3 at 11:30 o'clock a. m. at the office of the commission, State Capitol building, St. Paul.

The Greenfield Farmers Telephone Company has filed an application for authority to increase its rates for business, residence and rural telephone service within the city of Wabasha and the village of Kellogg, county of Wabasha, the proposed rates being as follows:

Individual Line Business	$2.00 per month
Two-party Line Business	1.50 per month
Individual Line Residence	1.50 per month
Two-party Line Residence	1.25 per month
Four-party and over	1.00 per month
Extension Telephone	.50 per month
Rural Multi-party	1.25 per month

Hearing will be had at the City Hall in the village of Wabasha at 10:00 o'clock a. m., and in the Modern Woodmen Hall in the village of Kellogg, at 3:00 o'clock p. m., on August 6.

The Lake Park Telephone Company has filed application for authority to increase its rates for business and residence

telephone service within the village of Lake Park, county of Becker, the proposed rates being as follows:

Individual Line Business	$15.00 per year
Two-party Line Business	14.50 per year
Individual Line Residence	11.00 per year
Two-party Line Residence	10.50 per year
Three-party Line Residence	10.00 per year
Four-party Line Residence	9.50 per year
Five-party Line Residence	9.00 per year
Business Extension Telephones	9.00 per year
Extension Bell	1.00 per year

Hearing will be held at the Modern Woodmen Hall, in the village of Lake Park, at 2:30 o'clock p. m., on August 8.

The Wheaton Telephone Company has filed an application for authority to increase its rates for business and residence service within the city of Wheaton, county of Traverse, the proposed rates being as follows:

Individual Line Business	$2.25 per month
Two-party Line Business	2.00 per month
Business Extension	1.00 per month
Individual Line Residence	1.25 per month
Two-party Line Residence	1.00 per month
Residence Extension	.50 per month

Hearing will be held at the Court House in the city of Wheaton, at 10:00 o'clock a. m., August 15.

Ohio

The consolidation of the two local telephone companies at Coshocton has been effected. Permission was received from the State Utilities Commission to make the merger, after waiting for over a year and a half. The Citizens and the Central Union Telephone properties will immediately be combined under one company. Neither company is going to absorb the other. A new company has been formed under the name of the Coshocton Telephone Company, which will buy out the Citizens and the Central Union Companies.

When the local concerns first thought of consolidating, it was necessary to take an inventory of all the properties of each firm and a report of the plans for consolidation, and submit it to the State Utilities Commission. To sanction this report of the standing of the two companies the state commission sent three men to Coshocton to go over the properties of the two companies and determine for themselves its true value. After this was done the commission gave permission to the local companies to consolidate.

When permission was received a meeting of the stockholders, officials and representatives of each firm was held and plans for the merger of the two firms were made.

The officers elected for the new Coshocton Telephone Company are: J. L. Rue, president, and W. S. Crater, secretary.

The new concern will take possession of the properties of the Citizens and the Central Union Companies August 1. Temporarily the office of the new firm will be located in the present location of the Central Union Company on Main street. Plans are complete and material is bought for the erection of a modern telephone plant on the southwest corner of Walnut and South Sixth streets. However, work will not being on the construction of this plant until the industrial and labor conditions are less tense.

Pennsylvania

Application has been made to the Public Service Commission for approval of the sale of the Central District Telephone Company, operating in western Pennsylvania, to the Bell Telephone Company, the consideration being given as $16,317,600. The Central has been a part of the bell system.

A new central office designation, "Knickerbocker," appears in the latest issue of the New York city telephone directory. This designation, which has been given to a number of telephones formerly served by the Greeley central office, increases the number of central office listings in New York to eighty-eight.

Protest Minnesota Deal

Protest against consummation of the proposed merger of the Northwestern Telephone Exchange Company and the Tri-State Telegraph and Telephone Company in Minnesota, as approved by the state railroad and warehouse commission, is made in the report of an investigating committee of the Joint Improvement Association, of Minneapolis and St. Paul.

The proposed merger is declared illegal.

The committee bases its contention on the belief that the Minnette law, under which the merger is planned, is unconstitutional. This law, it holds, violates that provision of the Federal Constitution that forbids states to pass any law impairing the obligations of contracts.

Under the proposed merger the two companies are to divide the state, each taking over the property of the other in its designated field, and the Northwestern company is to have all Minneapolis and the Tri-State all St. Paul.

By this arrangement, the committee points out, the franchise under which the Tri-State company operates in Minneapolis would be nullified and the enlarged Northwestern properties would be operated merely under an indeterminate state permit, as provided in the law, subject only to regulation by the Railroad and Warehouse Commission.

The committee says it has been unable to ascertain whether the Northwestern company is operating under a Minneapolis franchise or claims to have one. The Tri-State, on the other hand, it says, admits it is operating in Minneapolis under the franchise granted in 1898 to the Mississippi Valley Telephone Company and later assigned to the Tri-State.

This franchise stipulates that the holder cannot consolidate with another telephone company without consent of the city council, given by a two-thirds vote, nor sell stock to any other such company or its officers. Also the committee emphasizes these provisions in the franchise guaranteeing to the city—

Right of rate regulation.

Privilege of purchase.

Payment of a gross earnings tax.

It is submitted by the committee that under the merger plan the city will lose all these checks on the Tri-State company, that all its contractual rights will be taken away without council consent.

"The companies in their application to the state commission for permission to merge," a committee member says, "advance that the proposed step is advisable as a war measure; yet the commission in its report on the project says nothing about a war measure feature.

"The companies say the plan is for the purpose of saving by avoiding duplication of service; yet the Minette law itself has a section providing for making connections between competing telephone lines so as to give joint service to subscribers. This section of the law has not been anulled.

"The Northwestern company has refrained from telling us whether it has a franchise from Minneapolis, so there is doubt as to whether the council has rate regulatory power over it. But there is no doubt of the council's having such power over the Tri-State.

"Such control over one company forces the competing company to meet rates of the former which the council may establish, and hence gives an indirect regulatory power over the Northwestern. If this merger is effected, the city loses all such power."

Telephone Patents Recently Issued

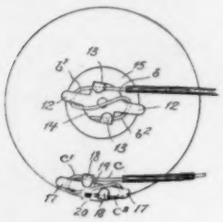
A Brief Digest of those Current Specifications Most Interesting to Telephone Men

BY DAVID S. HULFISH

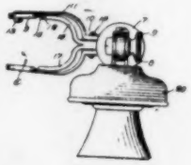
NO. 1,255,180. Operator's Circuit. Issued to C. W. Keckler, assignor to Western Electric Company, Inc., New York, N. Y. The object is to prevent an operator from listening upon two connections at the same time. When such an attempt is made, a tone is placed upon the operator's telephone.

1,255,211. Speech Repeater System. Issued to A. McL. Nicholson, assignor to Western Electric Company, Inc., New York, N. Y. The apparatus is of the thermionic type, with several bulbs in series, some of them containing four electrodes, and arranged to give successive amplification of speech currents.

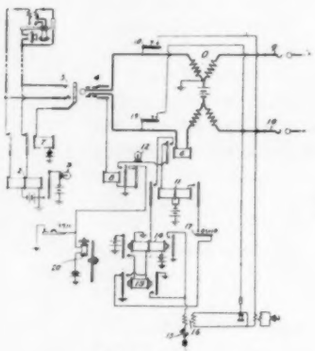
1,255,248. Swivel for Telephones. Issued to Alfred Toll, Kansas City, Mo. The line conductors are attached to brushes in a swivel box, the flexible telephone cord being attached to the swivel drum, and a handle or key is arranged to break the connection if desired.



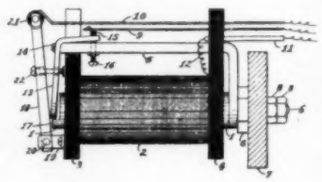
1,255,310.



1,256,512.



1,257,370.

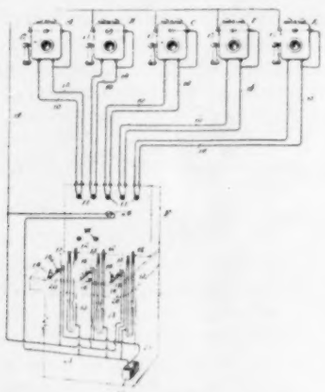


1,259,901.

1,255,310. Battery Terminal. Issued to Albert F. Henderson, Middleton, Mass. The battery terminal is a clip with prongs so shaped that a twist of the wire through the prongs gives a permanent connection.

1,255,374. Universal Cord Circuit. Issued to C. S. Winston, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. The cord circuit is designed for a private branch exchange manual switchboard, and connects with branch manual lines and trunks to the central office, indiscriminately.

Reissue 14,430. Ringing System. Issued to H. Hovland, assignor to Automatic Electric Company, Chicago, Ill. (Original patent No. 1,158,221, dated October 26, 1915.) In an automatic telephone system having party lines, switching mechanisms at the central office are arranged to permit a station upon a party line to set up connections permitting a conversation with another station upon the same party line, the central office then sending upon the party line two ringing currents, one for each of the stations, calling and called, so that the calling station may be notified that the called station has been rung.



1,256,123.

1,256,087. Linefinder System. Issued to S. B. Williams, Jr., and E. H. Clark, assignors to Western Electric Company, Inc., New York, N. Y. Lines having special service, such as pay-stations, are arranged in the linefinders of a call-distributing system in such way that calls from thase lines will be switched to special operators handling that class of call.

1,256,123. Switchboard System. Issued to George I. Galitzka, New York, N. Y. In a private or private branch system, an electric visual signal is displayed at the telephone set whenever the operator's set is connected to the telephone line. The object is to prevent listening by the operator during conversation between two lines.

1,256,511. Automatic Switch. Issued to J. G. Blessing and B. D. Willis, assignors to Automatic Electric Company, Chicago, Ill. A switch of the Strowger type in which the first movement is downward instead of upward, the normal resting position of the brushes being at the top.

1,256,512. Switch Hook. Issued to J. G. Blessing, assignor to Automatic Electric Company, Chicago, Ill. Two hooks are united, the inner fork being stiff that it may support the telephone weight and the outer fork being a spring member for clasping the receiver body.

1,256,698. Switchboard System. Issued to L. H. Johnson, assignor to Western Electric Company, Inc., New York, N. Y. A switchboard has both common and battery magneto lines; the cord pair is universal, connecting to both types of line. In addition, a recall signal is arranged to flash continuously when either type of line signals during connection, the flash being stopped when the operator closes her listening key.

1,257,180. Callsender. Issued to G. A. Betulander, Sodertorns Villastad, Sweden. In a telephone desk stand, instead of a dial a straight slot has a spiral within it and a slider turns the spiral when slid along the slot to the desired directory number.

1,257,283. Automatic Telephone System. Issued to A. H. Dyson, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. (Application filed August 19, 1907.) The callsender is normally locked, and a current from the central office, sent only after the line has been picked up by the linefinder system, is sent to the substation to unlock the call sender.

1,257,370. Operator's System. Issued to A. E. Lundell, and F. A. Stearn, assignor to Western Electric Company, Inc., New York, N. Y. When a telephone user tries to recall the operator by working the hook, a tone is placed momentarily upon the operator's telephone, even though she is not at the time connected to the line trying to recall her.

1,257,715. Automatic Switch. Issued to John A. Kropp, assignor to Western Electric Company, Inc., New York, N. Y. The magnetic system of the switch is simplified, the switch being of the general type of the Strowger switch, and the operating magnet or adjusting magnet being used also for releasing, thus saving the release magnet.

1,258,956. Selecting System. Issued to A. B. Smith, assignor to Automatic Electric Company, Chicago, Ill. An automatic switch of the Strowger type, with two directions of movement for selection, uses two pulls of the dial to complete the

vertical movement. This permits a larger number of levels in the switch.

1,259,862. Party Line Apparatus. Issued to Willi Herrmann and Otto Stritter, Lichtenrade, Germany. Each station has a stepping selector, and when the stepping impulses have been given, a ringing current is placed upon the line which rings the selected station and restores the other stopping devices.

1,259,901. Relay. Issued to F. R. Parker, Chicago, Ill. (Application filed February 19, 1904.) A combination line-cutoff relay, with one core and two armatures; a weak current operates one armature to close the points; a strong current operates both armatures and opens the points.

Substitute for Cedar Poles

During the Pacific Coast N. E. L. A. meeting, discussion of L. M. Klauber's paper on "Substitute for Cedar Poles" (May TELEPHONE ENGINEER) was opened by R. E. Cunningham of the Southern California Edison Company with the following paper:

"As Mr. Klauber's paper leaves open the question of length of service to be obtained from Douglas fir, it is possible that some definite idea can be obtained from the report of the U. S. Department of Agriculture Forest Service on experiments with Western yellow pine. I understand that the Western yellow pine has much the same characteristics as Douglas fir.

"In 1906 the Forest Service began a test on the treatment of poles, known as Project L-34. A large number of cedar and yellow pine poles wer treated in an experimental plant installed at Wilmington, California, and these poles were set in regular line construction by a number of power and telephone companies, reporting back to the government date and location where poles were set. The following is a complete copy of the last progress report covering the experiment on yellow pine poles, which I believe is of special interest to us at this time. By the government's report it would appear that hot creosote open tank treatment will preserve the butts of the poles a reasonable length of time, but some method should be adopted for preserving the portion of the pole above ground.

"The Western pine poles installed in and near Los Angeles under this project comprised a special shipment of 81 35-foot poles cut at Pine Ridge, Madera County, California, in summer of 1906. They were to be used in trying out a new apparatus designed to treat only the butts under pressure. Upon trial this apparatus was found to be impracticable because it could not be made to prevent loss of preservative through season checks in the poles. Forty-eight of them were therefore given the ordinary open tank treatment with carbolineum.

"After treatment the poles were distributed among the six co-operators in Los Angeles. Subsequently the U. S. Long Distance Telephone & Telegraph Company became a co-operator by taking over most of the experimental poles owned by the Home Telephone Company. Nearly all installations were made in 1907-1908, three being recorded as set in 1909.

"A few of the poles were carried away by floods, one was broken in moving and twelve have since been removed because new construction required higher poles. The total number included in this report is fifty. The result of the inspection is as follows:

Condition of Butts, November, 1916—

Treatment—	Sound	Rotted Off	Total
Creosote, tank	25	0	25
Carbolineum, brush	0	11	11
Untreated	0	14	14

"This table includes all of the carbolineum brush treated poles in the experiment, and all untreated poles for which there are setting records, except such as were destroyed by floods.

"The average life of the poles treated with carbolineum was five years and two months. This includes two which were set in concrete and which remained in service two years and four months longer than any of those similarly treated and set directly into the ground. With these two omitted, the average life was four years and five months.

"The untreated poles gave an average service of three years and six months. This includes one set in concrete which remained in the line three years and two months longer than any untreated pole in the experiment set directly into the ground. Two others set in concrete lasted four years and eight months and five years. With these poles omitted, the average life was approximately three years.

"Though all of the poles treated with creosote by the open tank method are sound below ground, i. e., in the portion treated, nine show serious decay in the tops. One untreated pole which was stubbed when rotted off shows serious top decay. One which failed before 1912 and which had been attacked by woodpeckers, was decayed below the nest. At least two of the untreated poles were attacked by insects below the ground line, decay being hastened considerably thereby."

SUMMARY

Western yellow pine is not a satisfactory pole timber for use in the vicinity of Los Angeles.

1. Untreated Western yellow pine poles show an average life of about three years.
2. Such poles, given a brush treatment (2 coats) with carbolineum last about four years and five months.
3. Such poles given an open tank treatment with creosote show 100 per cent of butts sound in 8¾ to 9¾ years.
4. Of 28 such poles in service 8¾ to 9¾ years, eleven or 39.3 per cent show serious decay in the tops.
5. A brush treatment with carbolineum is not a satisfactory protection for such poles.
6. An open tank treatment with creosote has given perfect protection over a period of 8¾ to 9¾ years.

E. A. Quinn said that the San Joaquin Light & Power Corporation is using Port Orford cedar instead of treated poles. Tamarack pine poles, given an open tank butt treatment, and put in the ground in 1908 with 33 lbs. of creosote per pole, all had to be stubbed within five years.

C. O. Poole cited satisfactory results with lodgepole pine poles treated in a temporary portable tank in 1908. Although no penetration was perceptible after 24 hours boiling, yet 600 poles thus treated lasted nine years.

S. J. Lisberger reported that the Pacific Gas & Electric Company is using concrete reinforcing stubs, as is likewise the Pacific Telephone & Telegraph Company. Stubbed poles that have been in service three or four years are still as good as ever.

E. R. Northmore of the Los Angeles Gas & Electric Company has concluded that concreting old poles does not pay because the rot follows up to the top of the concrete. He prefers treated stubs.

L. M. Klauber believes that concrete stubbed poles which have been in service at San Diego for nine years are as strong as when first put in. There is no danger in this method if all the old rot is cut out and replaced by a 4 to 6 inch concrete collar with mesh reinforcing. At present prices of 30 cents a foot a new pole costs about $50 to set in place, including labor, whereas $7.50 will pay for reinforcing.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers are Doing to Advance the Art

Illinois Men See Anchor Demonstration

Twenty-seven managers of National Telephone and Electric Company offices were in Clinton, Ill., July 18, where they were called by the general manager, E. S. Sterrett of Henry, Ill., to attend an anchor demonstration given by the Chance Manufacturing Company. Col. T. S. Milligan, a representative of this company, was in charge of the demonstration, which was given at the fair grounds, north of Clinton, during the afternoon. The demonstration was to prove the efficiency of both labor and strain tests of the Chance anchor.

Among those present for the demonstration were: E. S. Sterrett of Henry, Ill.; G. W. Pringle of Carlinville, Ill.; A. T. Vanniman of Girard, Ill.; Fred Miller, Illiopolis; S. A. McFarland, Armington; J. F. Atwater, Washington; T. A. Aainsworth, Bloomington; Mr. Witts, Sullivan; W. L. McLaughlin, Chillicothe; J. S. Hughes, Macon; F. W. Marshall, Henry; T. S. Milligan, Centralia, Mo.; Henry Diel, Weldon; Guy Walden, Farmer City; Mr. Heffinger, Hopedale; M. J. Hill, Decatur; G. W. Bowling, Clinton.

Portland Officials Like Automatic

Mayor Baker and the other city commissioners of Portland, Ore., are outspoken in their statements that the automatic telephone is the most satisfactory and serviceable from every standpoint, and that in case the proposed consolidation between the Pacific Telephone & Telegraph Company and the Home Telephone Company in that city is effected, they will endeavor to have automatic telephones supplant the manual system throughout the city.

Steps to this end were launched at an informal meeting of the council when the city attorney was directed to prepare an opinion setting forth what powers the council has to force the consolidated company to discard the manual telephones now in use by the Pacific Telephone & Telegraph Company and install in their places the automatic telephones now in service in the Home Telephone system.

In addition the city attorney was directed to advise the council whether the city can legally consent to a merger of the Home Telephone Company with the rival company under the terms of the franchise of the former utility, or if the city can force such a merger if it is deemed advisable.

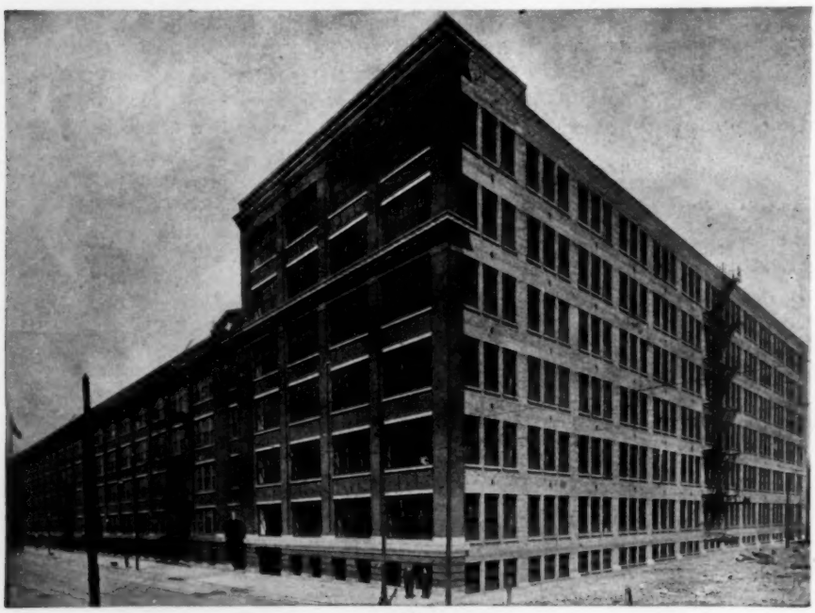
Many complaints of the service being given by the Pacific Telephone & Telegraph Company are being received daily and conditions are growing worse each day. Officials of the company say that they are unable to remedy the situation by reason of the fact that they are unable to employ and hold experienced operators.

"I am favorable to the automatic telephones," said the mayor. "They are supplanting the manual system in other cities, and in Los Angeles they have nothing but the automatic. If we are to have but one system in Portland I would like to see the automatic telephones in universal use."

Commissioners Bigelow and Mann agreed fully with the mayor.

Large Addition to Chicago Plant

"Moving day" is approaching again for the Kellogg Switchboard & Supply Company—not a change in location, to be sure, but the occupying of the first new six-story and basement addition at the east end of the big Kellogg plant in Chicago.



Kellogg Plant Addition

This fine new building is built in uniform style with the main structure and was finished to allow the addition of two more floors to the main building as soon as occasion requires this additional space. The new building has six stories and basement and extends 66 feet on Adams street and the full depth of the main building extending 237 feet to the north.

It is planned to begin spreading out by moving some of the more crowded stockrooms and manufacturing departments first. Each floor and basement opens directly into, and is a part of, the main factory. The change in location of the departments into the new building, in addition to giving much nedeed room, will improve the factory routing.

When the new building is completely occupied, it will make the total floor space of the Kellogg main manufacturing plant 515,000 square feet.

Kellogg Company's Supply Department

In the earlier stages of telephony, central office and substation equipment received the greater portion of the attention and thought of engineers and those interested in the development of the art.

The result of this concentration of effort is evidenced by the high standard of apparatus available. Simplification of circuits and improvement of manufacturing methods are the product of years of hard, conscientious endeavor by some of the best manufacturing and engineering talent this country has produced.

The many refinements found in high grade telephone equipment, such as the common battery switchboard, with many automatic features in its operation; the substation of both the magneto and common battery types, simplified in construction and circuit arrangement to super-relative degree; and the transmitter, receiver and other apparatus, have been developed to a point apparently beyond the reach of further improvement.

These and many other accomplishments, too intricate to epitomize, have been attained and it is only natural that such apparatus, which is the very heart of the telephone plant, received the lion's share of the attention of those engaged in the industry.

During this early development period, other essentials of equal importance in the successful operation of the telephone were, in many instances, relegated to the rear as a secondary consideration.

While it is not intended to convey the idea that telephone line material and supplies were at any time entirely ignored, it is a fact that only within the past few years has an equal degree of discrimination on the part of the telephone manager, in the selection of his supply and construction material and his source of supply, become evident.

To meet this ever-increasing demand for better material and service and for supplies especially adapted to the requirements of the telephone line, the Kellogg Switchboard & Supply Company has been enlarging its stocks and adding to the personnel of its supply department men of practical experience in telephone construction work. The result is, an organization of practical telephone men, familiar with the problems of the operating company, who are applying all of their energy in the interests of telephone customers.

Large stocks of select material, including everything required from the pole to the central office, prompt shipment on orders of any size and attractive prices, explain the increase in Kellogg's supply business and is a testimonial of the telephone industry's appreciation of Kellogg service.

W. R. Brewer is manager of the Kellogg supply department, assisted by J. L. Tucker, who handles the correspondence, and R. C. Ridpath, in charge of supplies.

R. C. Ridpath.

W. R. Brewer.

J. L. Tucker.

Foochow Telephone Co. Flourishing

The Foochow (China) Telephone Company is a private stock company with a capital of $45,000 Mexican ($32,760 gold). The number of subscribers increased to 560, which is about the limit of the capacity of the five switchboards now in operation. The company proposes to install more switchboards so that the service can be extended. Since the adoption of the double-wire system the service has been improved greatly. The English-speaking operators now number 20, the men working in four-hour shifts of six men each. The subscription fee for an ordinary wall telephone is $60 Mexican ($43.68) per year, and for the mitrophone $72 Mexican ($52.42 gold) per year. Half price is charged for one switch telephone.

Bond Buyers Hold Back

Unofficial advices are that the stockholders of American Telephone subscribed for only 30 per cent of the $44,500,000 convertible bonds. Underwriters will take the balance. It is understood that New England is credited with 60 per cent of such subscriptions as came in, which is just about the percentage of ownership. The failure of stockholders to take these bonds notwithstanding they offered on better than a 7 per cent income basis was, says the Boston correspondent of the *Wall Street Journal*, clearly due to fear of Government control. Investors in telephone securities are disturbed over the prospect of Federal operation of this highly technical complicated business.

Laboratory for Magnetic Research

Dr. Chas. W. Burrows, formerly of the Bureau of Standards, Washington, D. C., has established a laboratory at Grasmere, Borough of Richmond, New York City, for the experimental study of problems relating to the magnetic characteristics of material and apparatus.

The initial laboratory equipment provides very fully for all lines of magnetic research and has modest facilities for such chemical and metallurgical investigations as may be required during the course of the study of magnetic material and phenomena.

While the work will be confined to investigations along magnetic lines it will cover several phases. Attention will be paid to the design, procurement and installation of magnetic testing apparatus suited to the particular requirements of the individual manufacturer. This will include the instruction of the testing operator as well as the maintenance of a continuous inspection and advisory service so as to reduce to a minimum the difficulties inherent in commercial testing and research and to aid in the solution of new problems as they arise.

The magnetic analysis of steel and steel products with a view to the determination of homogeneity and uniformity of output as determined by mechanical and thermal treatment will form one of the important activities. The importance of this work in the determination of the shop conditions which will yield the desired homogeneity and uniformity is gradually being realized by the makers of high grade steel products whose excellence depends largely upon uniformity of the raw material and upon scientifically determined and carefully carried out heat treatment. Here also the design and installation of suitable equipment together with suitable instruction and service facilities are needed.

A third phase of the work includes the investigation of apparatus and materials. A study, both theoretical and experimental, of the properties of iron and steel and of electromagnetic apparatus, which will yield reliable data upon which to base the details of design and manufacture, may be expected to lead to a perfection of product and excellence of performance greatly to be desired.

Finally the design and development of new apparatus to meet specified requirements will be undertaken. This phase of the work will include the development of apparatus which has not previously received careful scientific consideration. Frequently an inventor has the fundamental principle in mind but is unable to get satisfactory performance because of insufficient knowledge regarding the influence of apparently minor details.

In general service will be rendered to manufacturers by the improvement of their product, to inventors by the practical realization of their ideals, and to financiers by reliable information as to the possibilities of a proposition under consideration.

Dr. Burrows has rather unusual qualifications for the work he is about to undertake. In 1905 he received the degree of Doctor of Philosophy from the University of Michigan. Since then he has been a member of the scientific staff of the National Bureau of Standards at Washington, D. C. During this period he has reduced practical magnetic testing to an exact science. The Burrows magnetic permeameter is the standard method for commercial as well as for precise magnetic measurements in this country. His greatest achievement has been in the discovery and development of the science of magnetic analysis. By the application of this science it is possible that the mechanical methods of testing iron and steel will be revolutionized. By no other means is it possible to identify or differentiate steels of closely similar characteristics. Steels of the same chemical composition but differing slightly in heat treatment, which have no discernible differences when viewed under the microscope show marked magnetic differences and are thus readily classified. Magnetic analysis is thus of practical importance in the determination of the mechanical properties of steel, and of boundless possibilities as an instrument of research.

Much of the work of Dr. Burrows has been described in the publications of the Bureau of Standards and in the technical press of the country.

Converter Solves Ringing Problem

"Have you any suggestions for describing the advantages of the Kellogg No. 3 Converter?" was asked one of the Kellogg sales engineers recently. "You can

Closed View *Open View*

hardly describe its advantages too emphatically," he replied. "Our new No. 3 Converter is self-starting.

"It is not affected by variations in voltage. It runs quietly and will not hum, whine or groan under extreme service conditions. It has an unusually small number of parts.

"This converter is not affected by short circuits. There is no change in adjustment required when switching from lighting circuit to dry battery. Also, there is an emergency provision in the design of this converter which makes an emergency operation from dry battery possible where the electric light service is unreliable, and is subject to a temporary shut-down. The use of this converter affords a splendid chance to "Hooverize" current, as our Mr. Cassaday expressed it, and this is certainly true when you remember that

dry battery current costs $14 per kilowatt, while the Kellogg Alternating Converter costs from 6 to 16 cents per kilowatt and hardly operates the meter when ringing. It costs only from 25 to 60 cents per month and is the last word in ringing economy.

"This No. 3 Converter converts 110 volt, 60 cycle alternating current to 20 cycle ringing current of true wave form. We said it was not affected by variation of voltage, and this is true, as we know from long repeated test that this apparatus is reliable in operation on voltages bearing from 90 to 125 volts.

"The small number of parts means simplicity and accessibility. There is only one rectifier relay, free from complication.

"Carbon and tungsten lamps are protection against short circuits and insure quick, snappy rings for either long or short code ringing on heavily loaded lines. The No. 4 Converter is a pulsating and alternating current for use with old style biased ringing.

"It can be furnished to operate on 220 volt, 60 cycle. When ordering, specify voltage and frequency of your electric light service. In this connection, it may be stated that the Kellogg Company has a ringing machine for every requirement. Its engineers will solve your ringing problems."

Delaware, Ohio, Orders Equipment

The management of the Citizens' Telephone Company of Delaware, Ohio, on June 28, signed contracts with Automatic Electric Company for a complete rehabilitation of the Delaware exchange.

Central office apparatus sufficient to care for 2,400 stations and subscribers' equipment for 1,900, was included in the order. Automatic mechanism purchased, will be of the present standard type, the switches having iron frames, horizontal relays, and covered with dust proof covers.

The equipping of the Delaware exchange with the girl-less system, makes the 18th Ohio city served by Automatic equipment.

The management of the Citizens' Telephone Company and the people of Delaware have long been familiar with automatic telephone service, for only 20 miles to the south, Columbus, the state capital, has been using the Dial for many years, and Marion, an equal distance to the north, has had a girl-less system in operation for nearly a year.

But in addition to the general familiarity of the Automatic system thus acquired, the company's official, with Prof. N. G. Hornmell, head of the Physics Department, and dean of men at the Ohio Wesleyan University, as chairman of the purchasing board, made a very careful study of the details of the equipment, its operation and the service it renders.

After a careful investigation of all manner of telephone equipments offered today, came the realization that new equipment other than full automatic, would be inadequate to meet the present and future needs of the company.

The management of the Citizens' Telephone Company, since its conception 21 years ago, has been confined to the leading business and professional men of the vicinity. Depending upon local patronage for support, the company has naturally sought to shape its policy so as to satisfy the public, and has consistently endeavored to give the best service possible under the circumstances.

The present Board of Directors includes: Messrs. C. D. Young, W. C. Devin, George H. Carter, F. A. Owen, W. M. Heseltine, A. S. Conklin, J. A. Gooding, Dr. A. J. Pound and Prof. W. G. Hormell.

In addition to the main Delaware exchange, the Citizens' Telephone Company will equip complete with the dial, its extensive county toll line system, connecting with 9 satellite exchanges. These switchboards will all be equipped to dial direct to subscribers in Delaware, and through this center to other automatic exchanges, such as Columbus, Marion and Bucyrus. Several hundred rural stations will be served for the present with manual equipment, but eventually these, too, will be converted to automatic operation.

Kellogg at the Convention

The Kellogg Switchboard & Supply Company's exhibit occupied rooms 1716, 17, 18 and 19, at Hotel La Salle as usual, and its complete display was the usual center of interest to the telephone men. The illuminated display cases showing Kellogg parts in process of manufacture occupied a prominent place, and those who have not already seen these cases were greatly impressed with the high standard of Kellogg quality.

The instantaneous recall switchboard was in operation and showed how a magneto subscriber could as instantaneous recall, automatic listening, instantaneous disconnect, automatic ringing, etc.

A Kellogg universal switchboard was also in operation and showed how a magneto subscriber could call a common battery subscriber, each receiving the highest class service possible. With the use of the Kellogg universal board one line can be changed to common battery at a time without installing any new apparatus, by simply changing the wiring, thus aiding in the rate raising problem in many instances. A magneto switchboard, a P. B. X. switchboard and a cordless P. B. X. switchboard were also on display.

The grabaphone, magneto and common battery telephone panel showed the latest types of telephones for various uses. Each type was clearly coded, describing the apparatus contained and the price given, which was a great help to the many interested telephone men.

The Kellogg company exhibited a trailer in room 1918. This type trailer is built for telephone exchange service and can be used with any type of motor car or truck.

A Kellogg No. 3 converter attracted unusual attention, as this converter eliminates the use of dry cells for ringing purposes, which are expensive at the present time.

The Kellogg non-ring-thru repeating coil was demonstrated, proving that it is absolutely non-ring-thru, and at the same time the transmission qualities are said to be of the highest. The "heroic" reproduction of the desk stand in the lobby of the Hotel La Salle was furnished by the Kellogg Switchboard & Supply Company.

A novel decoration in the Kellogg exhibit consisted of a Kellogg Bakelite receiver with a U. S. silk flag in the center and flags of our six allies surrounding from the sides of the receiver.

A meeting was held on the 18th floor of the La Salle Hotel Friday morning for the Kellogg salesmen in the interests of the line supply field. Mr. Meyer, of

the Electrical Cable Co., with the aid of illustrated slides, discussed the making and insulation of telephone wire. The meeting was attended by all Kellogg salesmen.

Those in attendance at the Kellogg exhibit: J. B. Edwards, J. G. Kellogg, A. J. Carter, H. N. Faris, Ben Woodbury, C. M. Thompson, Claude Prueitt, J. B. Haley, Fred Seeley, H. W. Hogue, B. A. Parsons, F. L. Eldridge, W. W. Croswell, H. B. Dudley, W. R. Hind, S. A. Duvall, M. J. Corwin, W. R. Brewer, L. J. Tucker, C. D. Boyd, O. F. Cassaday, H. D. Currier, A. O. Clingman, Wm. Green, D. B. White, R. L. Niter, D. J. Gillespie, M. E. Young, R. J. Ridpath, Edw. I. Pratt, C. W. Nelson, Don Marshall, E. C. Benson and R. Strache.

A. T. & T. Bond Issue O. K.'d

Stockholders of the American Telephone and Telegraph Company, at a special meeting, authorized issuance of $50,000,000 6 per cent seven year bonds, convertible after two years into the stock of that company at 106. An aggregate vote of 3,128,776 shares was cast in favor of the issue, while 291 shares opposed it.

Clarence H. Venner entered a protest objecting to the contract with the banking syndicate underwriting the proposed issue, alleging that it was contrary to the company's charter. Mr. Venner alleged that by the sale of convertible bonds at 94, less commissions of 3 per cent or 4 per cent, the company will not receive par for its capital stock issued upon conversion of the bonds.

Replying to a question of Mr. Venner's regarding the disposition of the 3 per cent commission on the underwriting of the bonds, President Vail said that 2½ per cent was the syndicate's commission and the one-half of 1 per cent will be paid to the organizers of the syndicate.

A. T. & T. Gains

Net earnings of the American Telephone and Telegraph Company for six months ended June 30 show an increase of more than $3,000,000. The Bell Telephone system showed a loss of approximately $2,000,000. Figures for the American Telephone and Telegraph Company compare:

	1918	1917
Operating revenue	$29,497,261	$25,812,096
Net earnings	26,219,452	23,613,112
Balance after dividends	4,192,980	3,951,088

Bell telephone system reports for the same period:

	1918	1917
Operating revenue	$155,256,000	$136,188,887
Net operating revenue	48,863,000	45,371,599
Operating income	35,498,000	36,663,177
Gross income	39,913,000	40,432,957
Deductions	13,012,000	11,891,882
Net income	26,901,000	28,541,075
Dividends	19,800,000	17,697,502
Surplus	7,101,000	10,843,573

Indiana Convention in September

The Indiana Independent Telephone Association will hold its twelfth annual convention at the Claypool Hotel, Indianapolis on September 11, 12 and 13.

In connection with this will be a third annual operators' school of instruction which will be held in the Claypool Hotel at the same time.

Il Giornale d'Italia of Rome states that the telephonic connections between Sardinia and the Italian mainland will be completed this year.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES

John C. Symmes, a well-known resident of Atlanta, Georgia, died at his home in that city recently. Mr. Symmes at the time of his death held a responsible position in the engineering department of the Southern Bell Telephone Company of Atlanta.

Claire H. Law, district manager of the Interstate Independent Telephone & Telegraph Company at Sterling, Ill., has resigned his position to go to France to do Y. M. C. A. work.

After nineteen years of service, James T. Daniels, district manager of the Central Union Telephone Company at Columbus, Ohio, has resigned his position with that company. Mr. Daniels has been appointed the new secretary of the Columbus Chamber of Commerce.

W. A. Cooper has taken over the management of the Mountain States Telephone Company at Flaggstaff, Arizona, succeeding L. C. Riley.

C. R. Graham, for some time manager of the Oberlin Telephone Company, Oberlin, Ohio, has resigned to take up Y. M. C. A. work overseas.

Francis A. Houston of Concord, N. H., has retired as vice-president of the New England Telephone & Telegraph Company, Boston, Mass. Ill health is the reason for his retirement.

Walter Baker, who has been connected with the Eastern Indiana Telephone Company at Winchester, Indiana, has resigned his position to become manager of the Converse Telephone Company at Converse, Indiana.

Walter Moork, who has been employed by the Aitkin-Deerwood Telephone Company at Aitkin, Minnesota, for some time has left that company and gone to Vancouver, Washington, to take up work in the aviation service as lineman.

To have charge of a telephone unit of sixty girl operators and their supervisors was the commission given Miss Geneva Marsh of Omaha, Nebraska, recently. Miss Marsh received her commission to go to France a few months ago, while engaged as efficiency expert by the state telephone system in Detroit, Michigan.

Frank E. Heath, for the past eight years local manager of the Citizens Telephone Company at Grand Rapids, Michigan, has resigned his position with that company. Peter B. Orth is to succeed Mr. Heath.

John A. Campbell of Columbus, Ohio, was recently appointed manager of the Ada Telephone Company, Ada, Ohio. He will take charge of his new duties August 1.

Elmer Simons, who has managed the local office of the Michigan State Telephone Company at Ishpeming for some time, has resigned his position. Warren Tweedie of Marquette is to fill the position.

William McCune, general manager of the Plain Grove Telephone Company of Volant, Pennsylvania, died recently in that city.

Lieut. Hall T. Glessner, formerly with the engineering force of the Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y., has arrived safely in France.

U. N. Bethel of the New York Telephone Company has been elected a director of the Pacific Telephone & Telegraph Company in the place of J. M. Quay, deceased.

F. J. Marshall has been appointed manager of the Alameda, California, exchange of the Pacific Telephone & Telegraph Company, succeeding H. T. Brownlee, who has resigned to take up another line of business.

C. W. Rees, superintendent of the Tri-State Telephone & Telegraph Company at Grand Forks, North Dakota, has resigned his position with that company to accept a position at Sioux Falls, South Dakota.

William C. Keefe has been appointed manager of the local office of the Santa Barbara Telephone Company, Santa Bar-

bara, California, to succeed Louis Bienvenu, resigned. Mr. Keefe has been with the Bell company for the past eighteen years, and has for a number of years been connected with the Los Angeles office.

NEWS FROM THE FIELD

ARKANSAS

The Consolidated Telephone Company of Mount Ida, capitalized at $15,000, of which $1,000 has been subscribed, filed articles of incorporation recently. The corporators are: G. Cox, president; John L. McConnell, secretary, and Eugene Cox, treasurer.

Saying that the local plant of the Southwestern Bell Telephone Company at Pine Bluff is being operated at a loss of about $600 a month, officials of this company have asked permission to increase the rates of business telephones from $3 to $4 per month, with an increase in rates on residence telephones from $2 to $2.50 per month.

ARIZONA

The Mountain States Telephone & Telegraph Company recently started work on the conduit system for their lines in Bisbee, which will do away with all overhead wiring in the business district.

Jerome and Clarkdale are to have new telephone systems this year. Jerome is to be given a common battery system in place of her present magneto system, and Clarkdale is to have a magneto system of her own.

CALIFORNIA

On July 4, a fire of unknown origin destroyed the telephone exchange at Alpaugh.

A petition has been presented to the State Railroad Commission for the consolidation of the Pacific Telephone and Telegraph Company and the Redondo Home Telephone Company, at Redondo Beach. The Home company has applied for authority to take over the holdings of the Pacific company in Redondo and also for permission to issue bonds for approximately $50,000 in order to finance the consolidation.

Plans are under way by the Paradise Farm Center for the installation of a telephone exchange at Paradise.

G. A. McIntosh, recently of Newman, Stanislaus county, has located in Visalia to assume management of the Visalia exchange of the Pacific Telephone and Telegraph Company, taking the position left vacant by the promotion of O. I. Crites to the office of division district commercial superintendent at Modesto.

HAWAII

W. D. Stone, manager of the Hawaii Telephone Company, who has charge of the re-organization of the Maui Telephone Company, Maui, recently taken over by the Mutual Telephone Company, has recommended that in addition to an expenditure of $50,000 for the wire system, another $25,000 be expended in new buildings and equipment. A new central is to be established at Makawac, where a new building, to cost $3,000, will be erected for that purpose. A new exchange will also be erected in Hana, and the Paia and Lenaina centrals will be remodeled and put in a state of satisfactory repair.

ILLINOIS

Articles of incorporation have been filed by the White Heath Mutual Telephone Company, White Heath. Capital, $2,500. Incorporators, Thomas A. Branch, Noble P. Heath, James A. Perry, John F. Heath and Silas L. Sievers.

G. R. Harris, who has been in charge of the mechanical department of the Schuyler Telephone Company at Schuyler has resigned his position with that company. Joseph Huff is his successor.

Articles of incorporation have been filed by the Mann Telephone Company, Macomb. Capital stock, $44,000. The incorporators are N. E. Mann, E. M. Mann and J. C. Lawyer.

The Chicago Telephone Company will issue $4,000,000 of additional capital stock for the purpose of extensions and improvements in the plant. The new stock will be offered at par to the stockholders. The sum raised is expected to be more than enough to meet all the betterment plans of the company for 1918.

The Henry Telephone Company has been authorized by the Illinois Public Utilities Commission to increase its rates from $24.00 to $27.00 on individual line business telephones and from $18.00 to $21.00 on individual line residence telephones.

The Murphysboro Telephone Company, A. B. Minton, president, increased its capital stock from $250,000 to $375,000. President Minton said the increase of $125,000 in capital stock was for the purpose of extensions and betterment of the company's properties now being operated in ten counties.

At the annual meeting of the Citizens' Mutual Telephone Company of Cambridge, Dr. H. C. McMillan and H. C. Meinrich were re-elected directors, to serve two years. John Grau was elected to serve in place of L. A. Lyons.

INDIANA

The Mt. Ayr telephone exchange was recently purchased by James Hoon of that city.

The Home Telephone Company of Elkhart has been given permission by the Indiana Public Service Commission to issue 1,600 shares of preferred capital stock at the par value of $100 a share, bearing dividends at the rate of 6 per cent per annum.

Edward Patton has tendered his resignation as manager of the Farmers' Mutual Telephone Company at Vevay.

Articles of incorporation have been filed by the Azalia Telephone Company, Azalia. Capital, $5,000; to operate telephone lines and exchanges. Directors: Willis Newsom, John E. Parker, Will H. Newsom.

Articles of incorporation have been filed by the Eastern Indiana Telephone Company, Winchester. Capital, $400,000; to operate telephone lines and exchanges. Directors: P. E. Goodrich, J. A. Browne, R. J. Litschert, B. S. Hunt and James S. Engle.

The Citizens New Telephone Company and the Ellettsville Farmers' Telephone Company of Ellettsville have been consolidated.

The Chicago Telephone Supply Company of Elkhart, has taken over the business of the Ericsson Manufacturing Company, Buffalo, N. Y.

Plans have been completed by Manager F. O. Cuppy for the consolidation of the Bell and Independent telephone systems at Lafayette. The petition of F. O. Cuppy, manager of the Lafayette Telephone Company, for authority to sell $70,000 additional stock was granted by the Indiana Public Service Commission. Of this amount $55,000 is to be used in purchasing the Bell properties.

IOWA

The Montezuma-Grinnell Telephone Company has purchased the old telephone company at What Cheer, and an entirely new system has been installed. They now have a building valued at $6,000 and an equipment valued at $4,000.

The Marengo telephone exchange has recently changed hands. The new proprietor, D. C. Phillips of Indianola, will soon be in possession. The purchase price was about $40,000.

KANSAS

A petition to purchase and consolidate the two telephone exchanges at Garnett, was filed recently by W. P. Hemphill, president of the Kansas Telephone Company.

KENTUCKY

C. H. Coovert, who has had charge of the local telephone line work at Vanceburg for several years, has resigned.

V. E. Fisk, who has been manager of the Home Telephone Company at Benton for the past thirteen months, has been appointed manager of the same company at Russellville.

The Fayette Telephone Company, which operates lines in Lexington and Fayette county, has officially served notice on the City Commissioners that the company would increase the rate 50 cents per month per station, effective August 1.

The work of installing the new plant of the Cumberland Telephone Company at Frankfort has been completed so far as the switchboard and terminal facilities are concerned. The connecting up of the subscribers' lines and the placing of the cables under ground will be delayed for some weeks yet.

The Home Telephone Company of Bardwell has completed the installation of a new switchboard in their exchange.

MICHIGAN

E. H. Crowley has resigned as manager of the Valley Telephone Company at Caro to become manager of the Union Telephone Company of Durand.

The Michigan State Telephone Company has receintly laid a new cable six miles in length across the Straits of Mackinac, connecting the two peninsulas and representing the latest work in improved telephone cables for submarine purposes. The cable comprises twenty circuits and will replace a cable of thirteen pairs laid eighteen years ago. From a transmission standpoint the new cable will bring all points in the upper peninsula much nearer to Grand Rapids. The cost will approximate $50,000.

MINNESOTA

J. R. Marien has resigned his position as manager of the Rochester Telephone Company.

MISSOURI

A. E. Watson, owner of the Mutual Telephone Company, known as the Dade County Telephone Company, at Greenfield, has disposed of his interests in the company to Charles L. Ward of Kansas City.

Beginning August 1, telephone rates will be increased at Excelsior Springs, from $2.50 to $3.00 per month on business telephones, and from $1.25 to $1.50 on residence telephones.

NEBRASKA

An increase schedule of telephone rates has been allowed by the railway commis-

sion to the Bell Company at Valley, following the reconstruction of its plant there. Business phones will cost $2.50 and residence phones $1.50 and $1.25 hereafter, these rates including free service on the Elkhorn and Waterloo exchanges. Farm line subscribers will have the option of paying $1.25 for the Valley exchange service alone, or $1.50 for all three.

The Seneca Telephone Company, Seneca, has been authorized to increase its rates 50 cents on all classes of service. The business rate will be $2.00 and the charge to residence and farm line patrons $1.50.

NEW YORK

After discussing the matter for several weeks the Jamestown common council has ratified the merger of the Bell and Home telephone companies of Jamestown, the Home Company securing the Bell interests.

OHIO

At a meeting of directors held recently by the Urbana Telephone Company, R. H. Murphy was elected president of the company to succeed the late C. H. Marvin.

The Home Telephone Company at Chillicothe has increased its capital stock from $200,000 to $241,000.

Satisfactory progress is reported on the new South exchange building which is being erected for the Central Union Telephone Company at Rex and Thurman avenues, Columbus. The foundation has been virtually completed and work is to be rushed on the superstructure. An expenditure of $50,000 is involved in the improvement.

OREGON

Transfer of the properties of the Home Telephone & Telegraph Company to the Portland Home Telephone Company, a new organization, was announced recently, when the latter filed articles of incorporation. The capitalization of the new company is $3,000,000. The incorporators are Joseph M. Healy, Richard W. Healy, Richard W. Montague and J. C. Potter. The company will operate mainly at Portland, Corvallis, Albany and Oregon City.

PENNSYLVANIA

Application has been made to the Pennsylvania public service commission for approval of the sale of the Central District Telephone Company, operating in western Pennsylvania, to the Bell Telephone Company, the consideration being given at $16,317,600. The Central has been part of the Bell system.

SOUTH DAKOTA

The Dakota Central Telephone Company, operating lines at Wilmot, have been authorized by the South Dakota Railroad Commission to increase its rates.

TEXAS

Articles of incorporation have been filed by the Hillsboro Telephone and Telegraph Company, Waco. Capital stock, $80,000. To manufacture and sell telephone and telegraph instruments. J. B. Earle, Waco; A. F. Adams, H. L. Gary, Kansas City, Mo., are the incorporators.

At a meeting of the city council held recently in Palestine, the Palestine Telephone Company was given permission to put on an increased rate for telephone service. The new rates will be $2.00 per month for residence telephones and $4.00 per month for business telephones. The new rates became effective August 1.

Approval of the franchise merging the Southwestern Telegraph and Telephone and the Automatic Telephone companies' lines in Dallas was received recently by John C. Casler, president of the Dallas Automatic Company, from Thomas Watt Gregory, attorney general of the United States. This means that work will be started on consolidation of the lines within a very short time, according to Mr. Casler.

B. C. Davenport of Wichita Falls, has been appointed manager of the telephone company at Henrietta.

The Union Telephone Company of McKinney has been purchased by the McKinney Telephone Company of that city.

Articles of incorporation have been filed by the Denison Telephone Company with a capital stock of $125,000 for the purpose of taking over the exchange properties of the Grayson Telephone Company and the Southwestern Telephone & Telegraph Company in the city of Denison. C. B. Sullenberger has been appointed to manage the consolidated property.

The city commission at Port Arthur has received a petition from the telephone company to allow the raising of telephone rates from $3.50 to $5 a month for business telephones and from $2 to $2.50 for private telephones.

WISCONSIN

The Farmers' Telephone Company of Turtle Lake has purchased the Turtle Lake City telephone system at a cost of $13,000. The line extends throughout Barron county.

WYOMING

Plans are under way by the Platte Valley Telephone Company for a new exchange to be erected at Lingle.

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